CTORIAL SURVEY

CURRENT PRACTICE, EQUIPMENT AND MATERIALS

A LETROIT

MeGRAW-HILL PUBLISHING

COMPANY, INC.

PRICE 20 CENTS

CANTILEVER ARMS of 845-ft. tied-arch apan approach closure in Mississippi River bridge at Dubuque, Iowa

MARCH - 1943



The Steel Necessary to Replace It Must Be Sent to a Battle Front

The government has allotted a limited amount of steel for essential maintenance, but any part of that steel saved by repairing instead of replacing—is that much more steel for ships, tanks, guns, etc.

Much critical war steel now used for repairs and replacement of broken and worn parts can be saved if periodic inspections are made to discover failures in their early stages. Welding can be employed to rejoin broken parts, and to reinforce parts that show the effects of strain. Often times steel parts, and equipment, bent and twisted by accident, can be heated and straightened and put back into service, saving the new steel necessary for replacement. Steel

damaged by localized corrosion can be cut away with a torch and replaced, sometimes with scrap pieces of metal, saving replacement of the entire member.

There are practical methods for building up worn shafts, and other parts worn by friction. Very often a few vital parts of old machines can be reinforced with the minimum use of new steel, and the machines put back into service for heavy duty work.

All the new steel that America can produce has a vital place in the scheme for defeating our enemies. Do your part in the fight for freedom by using the minimum of new steel for maintenance.

Repair it! Don't replace it!



CURRENT JOBS and Who's Doing Them

BUILDINGS

Public – Navy Department awarded a \$10,275,000 contract for frame buildings in Pleasanton, Calif., to McNeil Construction Co., of Los Angeles. Navy Department awarded another contract for additional facilities in Virginia to Doyle & Russell, of Richmond, for \$9,387,000. The Byrne Organization, of Dallas, Tex., received Navy Department contact for additional facilities in Virginia, for \$8,038,000. In California, Bechtel-McCone-Parsons Corp., of Los Angeles, will build an industrial plant to cost \$6,200,000; federally financed. Military housing project is under way in Kansas by Olson Construction Co., W. J. Assenmacher Co., and Ernest Rokahr & Sons, all of Lincoln, Neb., for approximately \$3,000,000. Low bidder for housing contract in North Carolina was Central Construction Co., of Atlanta, Ga., with bid of \$3,544,000. Navy Department contract for additional facilities at Instrument Instructors School, at Atlanta, Ga., went to Mion Construction Co., local contractor, with price of \$2,200,000. In Portsmouth, Va., temporary housing contract, consisting of 1,075 units, will be built by Allen J. Saville, Inc., of Richmond, at an estimated cost of \$2,140,750. In Utah, housing project to cost \$2,470,000 is under construction by J. I. Barnes Construction Co., of Salt Lake City. Another housing contract in Utah is under construction by R. E. McKee, of Los Angeles, Calif., for \$4,241,500.

HEAVY CONSTRUCTION

Macco Construction Co., of Clearwater, Calif., was awarded Navy Department contract for additional facilities in California, for \$7,570,000. Successful bidders for contract to increase height of Ross Dam in Seattle, Wash., were General Construction Co., Morrison-Knudsen Co., and J. F. Shea Co., all of Seattle, with bid of \$7,144,922. Contract for improvements in California went to Pollock-Stockton Shipbuilders Co., improvements in California went to Pollock-Stockton Shipbuilders Co., of Sacramento, for \$6,420,000. A. I. Savin Construction Co., of East Hartford, Conn., submitted bid for waterfront construction in New York, at an estimated cost of \$5,000,000. Contract for improvements in Kansas went to Peter Kiewit & Sons Co., of Omaha, Neb., for \$3,000,000. Contract for reconstruction improvements was awarded to Western Contracting Corp., of Sioux City, Ia., with price of \$1,000,000. In Arkansas, R. B. Potashnick, of Cape Girardeau, Mo., was awarded contract for improvements and utilities with low bid of \$1,000,000. In Alabama, improvements are under way by Doullut & Ewin. of Mobile, for \$1.225,000. H. E. Wolfe, of St. Augustine, Fla., and J. B. Michael, of Memphis, Tenn., were awarded improvements contract in Tennessee, at an estimated cost of more than \$1,000,000. Navy Department awarded contract for additional facilities in Maine to F. W. Cunningham & Sons, of Portland, for \$1,929,000.

HIGHWAYS .

Among recent highway contract awards are the following Alabama: \$1,000,000 to Warren Bros. Roads Co., of Birmingham; Defense Plant Corp. will finance. Louisiana: \$742,444 to Ziegler Construction Co., of Nashville, Tenn. New Jersey: \$206,849 to Ell-Dorer Contracting Co., of Irvington; \$100,000.\$500,000 to Union Paving Co., of Philadelphia, Pa. Pennsylvania: \$1,018,969 to S. J. Groves & Sons Co., of Ridgefield; \$356,383 to Fred Berlanti & Son, Inc., of Harrison, N. Y.



For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How STEEL WAS SAVED in roof frame by welded diamond grid

How CANTILEVER METHODS erected three-span continuous truss bridge.

How DOUBLE FALSEWORK BENTS, adjusted vertically by hydraulic

— p. 50 How DOUBLE FALSEWOOD - p. 50 jacks at base, supported bridge span. - p. 50 How FINAL CLOSURE PIECE was placed in bridge truss to complete - p. 51 How **HOT RIVETS** were delivered through tube to riveting gang by air-operated rivet passer. —p. 51 air-operated rivet passer.

How BULLDOZERS can be operated to step up production.

- p. 52

How TREE REMOVAL can be handled by proper sequence of bull-52 How BROKEN-LINE TRAFFIC STRIPES were painted and sprayed with alass beads How AIRFIELD PAVEMENT was laid by three dual-drum mixers. - p. 57 How PRECAST CONCRETE BARS were used to form grating over - p. 59 - p. 60 How GUY DERRICKS placed concrete for large dam. — p. 60
How CANTILEVER FORMS were set for pouring concrete in blocks - p. 61 How HAND SHOVELS should be used to make digging most effective.

How **BLAST FUMES** in tunnel were reduced by air-water spray. – p. 63 How UTILITY CONSTRUCTION and maintenance were speeded up by special truck-trailer units.

— p. 64 SERVICE OF JACKS can be improved by proper care and How **TRUCK FLEET**, supplementing cableways, speeded delivery of concrete to dam. — p. 68 How SMOOTH CONCRETE SURFACE at dam was obtained with How RAILROAD TRACTOR PILEDRIVER of special mobile design aided track maintenance operations. — p. 69

How BRIDGE WRECKERS dropped river span on land. — p. 70

How TIMBER A-FRAMES on jacks supported 300-ft. steel trusses. — p. 72

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Textiles-in War as in Peace

World's oldest industry performs modern miracles

ITH ever quickening tempo the friendly hum of the spinning wheel has echoed down the centuries—symbol of a mightly industry. Its hum is heard today above the din of war.

Capt. Rickenbacker heard it as the lives of his party depended upon a thickness of rubberized fabric. The hard-pressed soldier on a far-off Pacific isle hears

it when he sees fresh supplies and ammunition descending from the sky via friendly parachute.

Adolf Schickelgruber hears it when winter joins forces with the enemies of his ill-clad armies and hastens the day of his defeat.

Yes, man is dependent upon textiles from the cradle to the grave – in peace and in war.

In peace man demands comfort and beauty. In war he must have comfort and protection. The textile industry is coming up to these expectations.

It is developing hundreds of special fabrics for special purposes. It has created clothing for wear, miles high in the stratosphere, and fathoms deep under the sea, clothing to meet the daytime heat of the desert and the bitter cold of its nights, clothing for the tropics and the Arctic, the swamps and mountains – for every climate and every condition.

Modern scientific warfare has forced the development of textiles that were not even thought of a year or two ago: camouflage nets: strong, light, wind-resistant Nylon tentings for the Arctic; heavy Nylon rope for glider towing; parachutes and parachute shrouds; self-sealing gas tanks; panzer hangars; cartridge and powder bag cloths; helmet linings; gas masks; fuses; canvas tops; windshield fabrics and seat upholstery for jeeps. trucks and other motorized equipment; uniforms for all armed services and for nurses, WAACS, WAVES, SPARS and MCWRS. Then there are windbreakers, raincoats, ski-troop uniforms and other items too numerous to mention. The Star Spangled Banner itself is a textile.

The Quartermaster Corps alone has issued specifications for over 300 different fabrics! Add to this the requirements of the Navy, the Air Forces, the various Civilian Defenses, the Red Cross and Lend-Lease and the sum total of textiles required for military and allied uses is approximately 70% of the total produced before the war to meet civilian requirements!

the war to meet civilian requirements!

How the textile industry has been able to meet this industrial and essential civilian needs, is an inspiring store.

Story.

First, it stepped up its production to an all-time high. Textile World's index of textile-mill activity records three successive records for 1940, 1941 and 1942, the period covering the defense program and the first year of the war. This index for 1942 stood at twice that of an assumed "normal" year. It is noteworthy that this was accomplished mainly with existing equipment.

Second, the textile industry did a job of plantconversion which was a masterpiece of intra-industry cooperation and idea-sharing.

Third, its technicians developed new and superior fabrics and finishes. Its engineers and production men increased the speed and the efficiency of the entire

How well all this was done becomes evident when we consider the obstacles to be overcome. Imports of critical fibres have been cut off. There is a shortage of certain chemicals and dyes. There is a high rate of turn-over in manpower and a shortage in experienced labor. It is increasingly difficult to secure machines and repair-parts – just to mention a few of the major problems.

But the textile industry delivered. It has built up

an adequate reserve for our rapidly expanding armed services. It is helping to supply the armies of our allies. It is providing for our civilian population...all without giving the war leaders a single moment of serious worry.

Major General Edmund B. Gregory, Quartermaster General of the United States, in special statements prepared for *Textile World*, and in addresses before textile groups, has stated that the cooperation of the textile industry has been outstanding and that the industry has kept ahead of schedule on all the major types of fabrics required.

General Gregory recently pointed out that of the approximately 234,000,000 yards of combed twill produced in this country in 1942, the Army took about 87%, the Navy 10%, leaving 3% for non-military

Col. Robert T. Stevens, of the Quartermaster Corps, in a recent address, referred to the output of duck. Production of that vital military fabric was twice doubled in six months, between January and July 1942, he said, and an annual capacity of 600,000,000 yards of all types of duck was made available. "The current rate of production of cotton duck is five times normal," said Col. Stevens, "and 38% comes from converted carpet, plush and upholstery mills. Based upon known requirements, production in this field is fully adequate".

requirements, production in this field is fully adequate". "Fully adequate" is high praise when it refers to duck production. At the outbreak of the war it looked as if there was no possible chance of meeting requirements, at least during the first year. Nor would there have been if other types of mills had not shifted to making this fabric, and if experienced duck manufacturers had not gone "all out" in teaching the newcomers, potential post-war competitors, everything they knew about the manufacture of duck. American industry offers many such examples of unselfish cooperation.

Another outstanding accomplishment, made necessary by the interruption of burlap imports, was the conversion of looms producing peacetime fabrics to the production of bag fabrics. The tremendous demand for sandbags, camouflage cloth, food, agricultural and other bagging, caused a conversion order to be issued for the purpose of raising the annual production rate of osnaburg from 263,500,000 yards to 660,000,000 yards, and bag sheeting from a rate of 488,000,000 yards to 855,000,000 yards. The result of this order, and of the military schedules already in effect, was to put the cotton weaving industry about 88% into war, essential industrial, and essential civilian production.

Plant conversion went on with feverish speed. Carpet looms were swung to blankets and duck; the lace industry turned to mosquito netting and insect netting of which it produced millions of yards. The flat-knitting

industry with its tricot machines also is engaged in the manufacture of mosquito netting. The sewing thread industry was converted to the production of combed yarns. What once was the silk industry is now doing a tremendous amount of war work. Those mills which had equipped themselves for throwing Nylon yarns for hosiery are now throwing the Nylon for parachutes. That section of the silk industry that was equipped for weaving rayon fabrics is producing fabrics of high-tenacity rayon for flare chutes, cargo chutes and delivery chutes. Many silk and rayon looms that formerly wove clothing materials are now weaving parachute fabrics.

Today practically all Nylon is used for military purposes and the bulk of high-tenacity rayon goes into military fabrics.

Above and beyond all the new developments is the gigantic job of producing millions of yards of standard fabrics of many colors and weaves. To produce all the uniform fabrics and blankets is in itself quite a job. The woolen and worsted industry has been doing it magnificently. Tent fabrics and summer fabrics produced by the cotton industry are no less a formidable assignment. I could point to myriad other jobs no less impressive.

impressive.

The production man can indeed take pride in the record and behind the production man, the textile technician has been working tirelessly. Mildewproofing and waterproofing, so vital in a world at war, are in a new stage of effectiveness. A new process for water proofing fabrics employs vinyl acetal plastic in place of precious rubber. Textiles that glow in the dark have been perfected for black-outs and other applications. American genius is solving problems many of which seemed insurmountable. Silk, for example, was some thing the Japanese thought we could never duplicate. A new synthetic textile filament that weighs but out eighth of the finest silk filament threatens to put the Japanese silkworm out of business after the war so far as we are concerned. The post-war possibilities of this development, challenge the imparination.

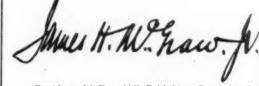
Nor has the primary textile industry been alone in its contribution to the war. The textile machinen industry has been converted almost entirely to war work, save for a few facilities required to relieve extreme bottlenecks and supply essential maintenance and repair parts.

and repair-parts.

Similarly, some textile mills, particularly hosiery milk hard hit by the silk and Nylon cut-off, are utilizing their space and skilled staffs to produce parts for war equipment.

The immediate significance of all this is its importance in the winning of the war. There is, however, a post-war implication which is important to the future of America. A mass production textile industry will serve civilians after the war more effectively than ever before, and will put new standards within the reach of millions. A long step has been taken toward that completely synthetic textile industry which some observers see in the future. The tempo of such changes has been accelerated tremendously. The oldest industry in the world, now one of America's largest, is showing a youth and vigor that promise much for the future anationally and internationally.

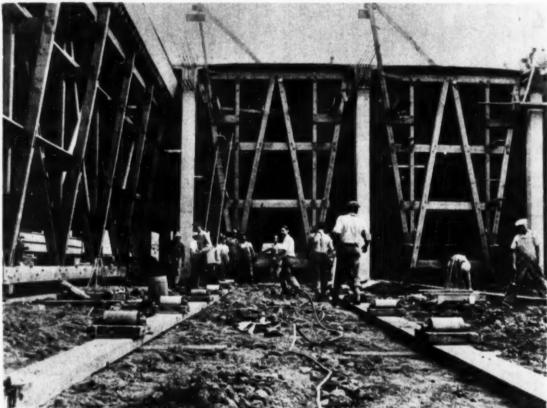
This is the ninth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.



President, McGraw-Hill Publishing Company, Inc.

Warspeed

WITH 'INCOR' 24-HOUR CEMENT



Mahony-Troast Construction Co., Contractor,

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Albert Nann Associated Architects and Engineers, Inc.



Line production schedules mean top speed at lowest cost. On jobs both large and small, 'Incor' is a 'natural', wherever design makes possible repetitive use of forms. 'Incor' and 24-hour form removal mean 50 to 60 per cent less forms, plus advantage of no reposting — clear space ready immediately for follow-up operations.

Outstanding example is this Mahony-Troast Warspeed job. Using traveling forms and 'Incor', concrete was stripped without reposting in 24 to 36 hours — high-speed, lumber-saving schedule, only 10% of area formed. Acres of vital war production space under roof in 49 days.

Use 'Incor'* 24-Hour Cement where it shows the lowest cost — forms, time and cement considered. Elsewhere, use Lone Star Cement. That's selective concreting — and it's the best way to get the most for your construction dollar.

*Reg. U.S. Pat. Off.

LONE STAR CEMENT CORPORATION

OFFICE ALBARY . BIRMINGHAM . BOSTON . CHICAGO . DALLAS . ROUSTON . INDIANAPOLIS . JACKSON, MISS. RANSAS CITY . NEW GREEAMS . NEW YORK . NORFOLK . PHILADELPHIA . ST. LOUIS . WASHINGTON, D.C.

LOWE STAR, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CENERAL PRODUCERS ... 25 MIGDEN MILLS .. 25 MILLION BARRELS ANNUAL CAPACITY



So that none of these tires will fail ...

A typical example of B. F. Goodrich leadership in truck tires

RIGHT this minute hundreds of tires on contractors' equipment are going bad long before their time. Precious rubber is being wasted. Time is lost on important jobs.

This is needless waste.

Every owner of rubber-tired equipment has a right to expect full efficiency and maximum life from that equipment—including the tires.

Drawing on the experience of many years in handling completely the tire maintenance for large bus fleets, B. F. Goodrich developed a special Tire Conservation Service for fleet operators. Under this comprehensive, point-by-point program factory-trained consultants take over the complete supervision of tire care.

Many of the country's largest fleet operators signed up immediately for this low-cost program. Today thousands and thousands of trucks are rolling under the watchful eyes of the B. F. Goodrich tire maintenance supervisor.

Owners send in reports like this: "We believe we will show a 25% saving"—"The number of failures has been reduced 60%"—"We have had only one tire failure in 149,863 miles."

Naturally with tire consultants on

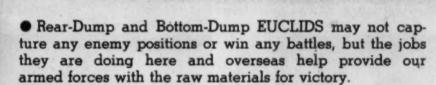
the job, you should be able to get the best possible service from your tires. Who else knows just when to recap, what tread design is best for soft earth, what is the best tire for tractor-graders? Who else can tell you about proper air pressure as you change from job to job and make constant recommendations on all tire matters?

This program, based on putting tire maintenance in the hands of trained tire men, was the first to be offered by any rubber company—another example of the leadership which has made B. F. Goodrich "First in Rubber".

If you would like details of this scientific tire conservation plan and how it can be applied to construction equipment, write the Tire Conservation Department, The B. F. Goodrich Company, Akron, Ohio.



ON 1 Sictory's property of the state of the



It's on victory's starting line—the open pit mines, quarries, power dams, army and navy bases, airports, cantonments, armament plants, ordnance depots, etc.—that Euclid speed, capacity and dependable performance have been called upon to complete tough jobs in record time and at lower cost per ton or cubic yard. Present deliveries are confined to high priority orders, but we're ready to help with your plans for after victory requirements.

The EUCLID ROAD MACHINERY Co., Cleveland, O.



E U C D SELF POWERED HAULING EQUIPMENT LARTH ROCK COAL ORE

SAFE WAYS IN WAR PRODUCTION



NEW WORKER—Every new employee in a Bethlehem Plant wears this button. It helps to fix his attention on safety. It signals to more experienced employees that he is new to the plant, and they keep an eye on him, and do not hesitate to offer friendly guidance in case he forgets instructions and unknowingly breaks any safety regulation.

Industrial accidents, bad enough because of the human distress they cause, are also a grievous drag on production. Every day that injury lays up a worker means lowered output of the materials our armed forces are asking for.

Safety engineers know they must be more than ever on guard as pressure for production intensifies and men work against time. When war came, Bethlehem Steel Company expanded its accident-prevention program to meet the new conditions. Special efforts were addressed to the new employee to make him safety-conscious from the moment he walked into the plant. And by posters, group meetings and individual instruction, the safe way of doing his job was ground into the subconscious of new Bethlehem employee and veteran alike.

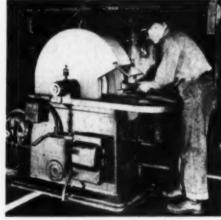
Significant are the results of a current study, showing that of all disabling accidents to Bethlehem employees less than one-third occur in the course of their work. Even with employment rolls upped by the tens of thousands and plant operations at top speed to meet the demands of the war program, the Bethlehem employee is safest, best protected against injury, during the hours he spends on the job.



AUTOMATIC HAND GUARD—This man is operating a trimming press. If he should absent-mindedly let his hands move too near the danger zone, the two cables will automatically whisk them back to safety, before the ram of the press descends.



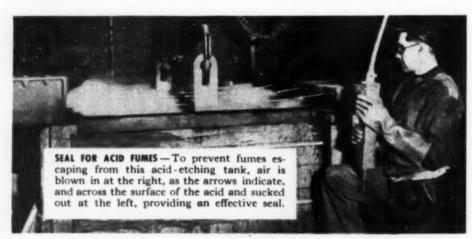
100% HEAT-INSULATED — Asbestos-covered hood, chrome-leather full-length apron, chrome-leather gloves, chrome-leather full-length sleeves and asbestos guard on torch handle give this worker complete protection against heat and flying sparks.

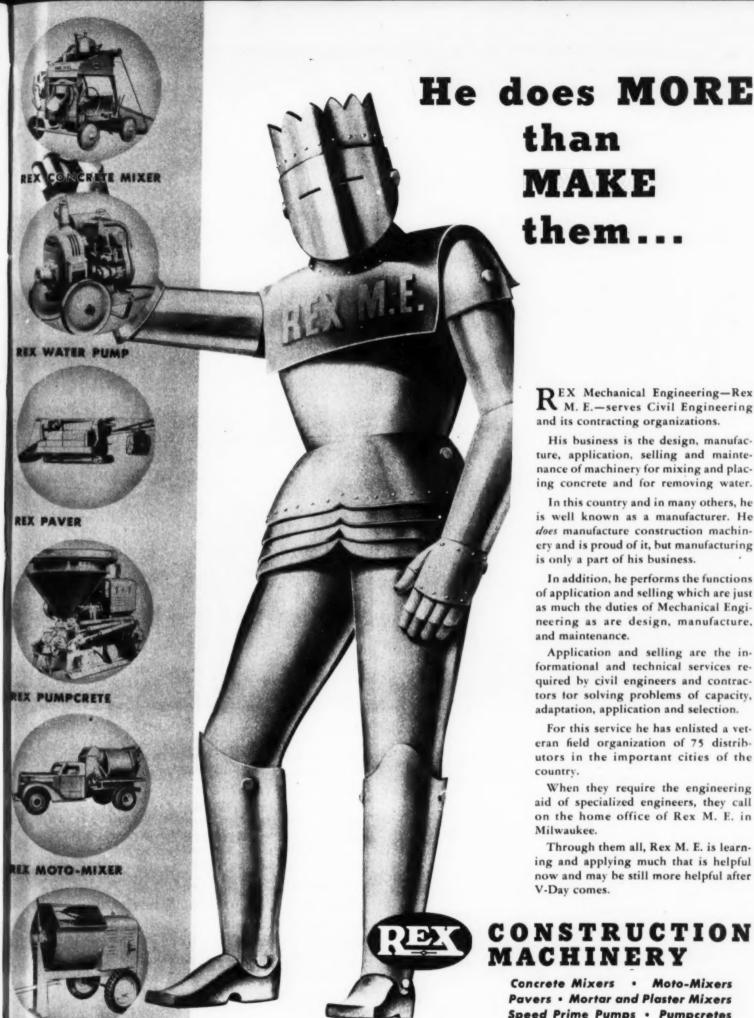


EYES DOUBLY GUARDED — Even though this grinder is equipped with a heavy glass shield, the eyes of the man who is operating it are given further protection against sparks or flying bits of abrasive by the cup goggles that he is wearing.



Bethlehem Steel Company is actively supporting the National Safety Council in its campaign against accidents in war production, through the War Production Fund to Conserve Manpower,





REX Mechanical Engineering-Rex M. E.-serves Civil Engineering

and its contracting organizations. His business is the design, manufacture, application, selling and maintenance of machinery for mixing and placing concrete and for removing water.

In this country and in many others, he is well known as a manufacturer. He does manufacture construction machinery and is proud of it, but manufacturing is only a part of his business.

In addition, he performs the functions of application and selling which are just as much the duties of Mechanical Engineering as are design, manufacture. and maintenance.

Application and selling are the informational and technical services required by civil engineers and contractors for solving problems of capacity, adaptation, application and selection.

For this service he has enlisted a veteran field organization of 75 distributors in the important cities of the country.

When they require the engineering aid of specialized engineers, they call on the home office of Rex M. E. in

Through them all, Rex M. E. is learning and applying much that is helpful now and may be still more helpful after V-Day comes.

CONSTRUCTION MACHINERY

Concrete Mixers . Moto-Mixers Pavers · Mortar and Plaster Mixers Speed Prime Pumps · Pumpcretes

TREMENDOUS TRIFLE

Just 3 parts per 1000. That's the proportion of calcium chloride (generally specified as 2 lbs. per sack of the cement) normally contained in a batch of concrete.

A trifle surely, but why tremendous? Because here is what calcium chloride does when added to concrete:

Accelerates the rate of hardening at very early periods to produce sufficient stiffness for finishing in less than half the usual time. Doubles the early strength with all cements and at all temperatures from 20° to 90° F.

Increases workability of concrete approximately 40% to fill forms quicker and more completely, thus cutting down the labor necessary for pointing up and finishing.

Bulletin No. 28 discusses these advantages in detail, contains much data from research and field experience. Write for it now. The Calcium Chloride Association, 4145 Penobscot Bldg., Detroit, Mich.





HELP MAKE BULLETS

The munitions of war are not made in their entirety in arsenals. They are partially produced in the forests, on the farms, in the mines. Without your

products the war plant could not function. And, every piece of machinery you obtain as new equipment or for maintenance takes just that many man hours away from the actual fabrication of bullets. It's your duty to conserve every bit of working metal that is entrusted to you.

That's why proper Lubrication is of vital importance today. That is why LUBRIPLATE lubricants are attracting so much attention. LUBRIPLATE actually conditions bearing surfaces and arrests progressive wear. It pre-

vents rust and corrosion and reduces power consumption. It possesses characteristics not found in conventional lubricants.

Take just one piece of equipment, your tractor. Just think what it would mean to you if you could double or treble its life, reduce replacement of parts and avoid unnecessary interruptions of service. That is what scores of tractor users are accomplishing with LUBRIPLATE.

Your investment in machinery of all kinds is certainly great enough to warrant your investigation of LUBRI-PLATE. Write today for a copy of "The LUBRIPLATE Film" written especially for your industry.



A TRACTOR USER WRITES US

"During the past three years we have handled over 25 million dollars in construction jobs. UBRIPLATE has not only enabled us to keep our tractors and other machinery continuously on the job — but has reduced our up-keep cost at least 60 percent."

LUBRIPLATE DIVISION

PISKE BROTHERS REFINING COMPANY

WRITE FOR THE NAME OF THE DEALER NEAR YOU

OWhiteman CONCRETE EQUIPMENT

SCREED STAKE CAP

1. Contractors can make up their own 2x2 wood stakes right on the spot, cut to proper length to suit the actual conditions of each job - using short stakes for hard ground and longer ones for fills of various depths.

2. This adjustable screed cap is cast of tough malleable iron to give long service.

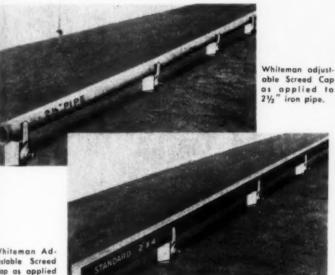
3. The metal cap is not likely to be broken up by driving, since a wood stake is first driven in, the cap then set on and adjusted to the proper level.

4. For decking, the wood stake is cut to the proper length and fastened to the deck.

5. The use of wood stakes instead of steel effects a conservation of that critical

6. Instantly adjustable; unnecessary to disturb the stake itself.

7. Either a wooden 2x4 or a 21/2" pipe is satisfactory for use as screeds.







Denser, More Level Floors Without Dry Topping

You get a denser floor with more even distribution of finer aggregates on the surface, when you prepare, the slab with this Grill Tamper. With a good concrete mix, dry topping is unnecessary. The "Whiteman" Tamper knocks heavier aggregates down — leaves a "fat" sufficient for finish. This inexpensive, light-weight, collapsible and adjustable Tamper saves time and money on all types of surfaces. Write today for full information.



SCREEDING

WHITEMAN Rodding Machine has power-driven screeds which simultaneously level and compact the mix while pulled forward by one man. Handles 4 cu. yd. of low slump mix in 5 minutes.



FLOATING

One man operating the WHITEMAN Finishing Machine with "Heavi Duti" rotating trowels covers 1,000 sq. ft. in 15 minutes.



FINISHING

Using the same WHITEMAN Finishing Machine converted by changing to "Finish" trowels, the same operator produces a dense hard, longwearing surface in record time. No hand work and better surface are the results.

OWhiteman MANUFACTURING CO.

3249 Casitas Avenue

Los Angeles, California



With Gardner-Denver Continuous Feed Tunnel Drills



WHEN emergency tunnels must be driven quickly for military transportation—roads or railroads, or for aqueducts—these Continuous Feed Drifters by Gardner-Denver prove their ability to speed the work. Here are some of the reasons why:

- No stretching between the drill throttle and the feed control—because all controls are grouped together on the drill back-head.
- 2. No "nursing" of the feed to keep it from "crowding"—
 once the feed control is set, the drill does the rest.
- 3. Requires no "third" hose to supply the feed—no separate oil supply—since the feed motor draws its air from the main air inlet.
- 4. Far less wear—because of minimum vibration and "slow-motion" feed motor.

For complete information on the Gardner-Denver Continuous Feed Drifters, write for Bulletin CF-2. Gardner-Denver Company, Quincy, Illinois.



Since 1859





WILL LAST LONGER ON PROPER SHEAVES

Although it is widely acknowledged that HAZARD LAY-SET PRE-FORMED WIRE ROPE is easier on sheaves than non-preformed rope, even LAY-SET will last still longer and give better service if it operates over the proper size sheave of the correct material.

A sheave that is too small imposes a severe fatiguing effect on the rope, which produces premature fracturing of its wires.

Sheave treads, sheave bearings, and fleet angles should all be watched to protect both rope and sheave life. Wherever possible, sheave diameters should not be less than the values given below:—

for 6x 7 construction
for 6x19 Seale construction
1 1 1 Fill 144
for 6x19 Warrington construction
for Flattened Strand
for 6x19 Filler Wire
for 8x19 Seale construction \
for 6x22 Filler Wire
for 8x19 Warrington)
for 0,10 Eiller Wire
for 6x37 Seale
for 6x41

Ask your nearest HAZARD man to help you get longer life and better service from your ropes and rope equipment. All HAZARD ropes made of Improved Plow Steel are identified by the Green Strand.

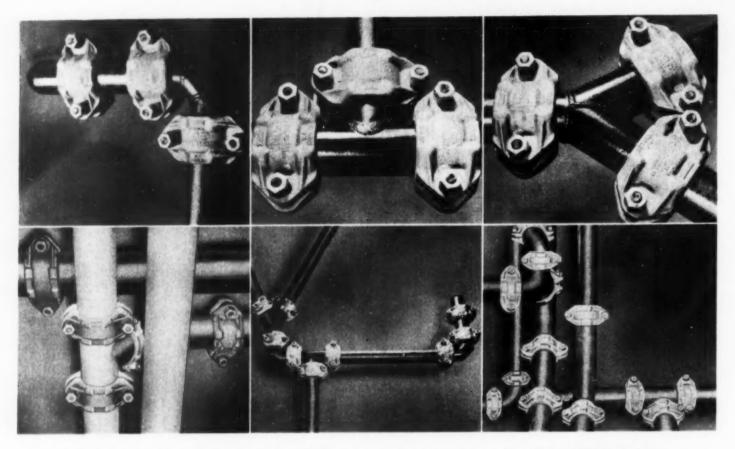
HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

HAZARD LAY-SET

WIRE ROPE



G-B Rolagrip Couplings and Segweld Fittings Help Shipbuilders Save Millions of Man-Hours

Long before an emergency existed many shipbuilders switched to G-B Rolagrip Pipe Couplings and G-B Segweld Fittings for sound and sufficient reasons.

 To save costly flanging, threading, beveling or grooving operations which waste millions of man-hours. Rolagrips are designed for plain end pipe and Segweld fittings.

2. To simplify and speed up installation. With a simple wrench G-B Rolagrip Pipe Couplings are applied in far less time than by any other method of joining pipe. There are only three parts to position; only two bolts to tighten.

 To release welders. Rolagrips and factory-made G-B Segweld Fittings not only speed up installation—they release welders for other ship assemblies.

4. To get a permanent, leak-tight seal on ship plumbing, fire mains, overflow, fuel oil, scupper, cargo, bilge, ballast and peak tank lines.

 To get safe, strong, yet flexible pipe connections. Tight-gripping Rolagrips allow for controlled movement to compensate for expansion, contraction and deflection.

6. To save weight and retain pipe strength. Rolagrips give greater strength with less weight. Applied on plain end pipe they avoid weakening the pipe wall by cutting away.

Shipment of Rolagrip Pipe Couplings as well as plain end G-B Segweld fittings are made in days instead of weeks. In case your pipe stock has grooved ends, we can supply G-B Gruvagrip Pipe Couplings.

GUSTIN-BACON MFG. CO.
KANSAS CITY, MISSOURI
Chicago New York San Francisco Tules Fort Worth Houston

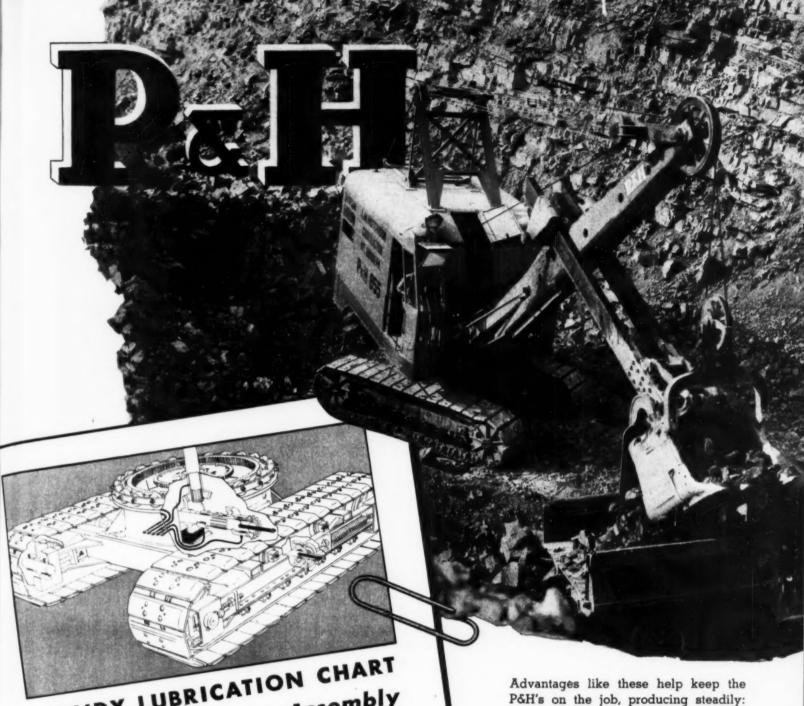
Chicago New York San Francisco Tuisa Port Worth Houston

ROLAGRIP

PIPE COUPLINGS FOR PLAIN END PIPE



The tighter the tension caused by expansion, contraction or deflection, the tighter the rollers grip to hold movement under uniform control.



HANDY LUBRICATION CHART for Complete Lower Assembly You can greatly reduce wear rollers, idler and drive

and tear — avoid time losses — by giving your crawlers the simple and regular care they deserve.

To make it easier for you, we have just prepared a timely War Service Bulletin with helpful instructions on the proper lubrication of crawler

sprockets, chains, shafts, etc., for all P&H Excavators. It will help you keep your machines in fighting trim.

ble while Uncle Sam counts so heavily on all available shovel equipment!

Don't take chances with trou-



A new star has been added to P&H's award for excellence in war production.

General Offices:

WELDED ONE-PIECE CONSTRUCTION OF ROLLED ALLOY STEELS provides

TRUE ROLLING CRAWLERS mean eas-

P&H HYDRAULIC CONTROL — easier,

greater strength and rigidity.

ier travel, less trouble.

faster, more positive.

4494 W. National Avenue, Milwaukee, Wisconsin

MEINER PER MELDING CLESTOODES - MOTORS

SEND TODAY FOR FOLDER, FORM NO. D-48

HEMPHILL PREPAREDNESS-

helps win the war with DIESELS



★ The huge and rapid expansion of Uncle Sam's war plans demand the immediate and continuous services of great numbers of Diesel engine operators and mechanics. To assist the Army and Navy in meeting this requirement for specialists, Hemphill Diesel Schools are training thousands of Service Men. Such an assignment was not entirely new to Hemphill. For many years our schools have been staffed and equipped to do a BIG job—an experienced job—in the Diesel training field—and facilities and Hemphill personnel have always kept abreast of Diesel progress. When Uncle Sam said "Let's go" we were ready.

Soon after our nation started mobilizing, many U. S. Army men were sent to our Chicago school for training. Now the Navy has taken over the entire facilities of the Chicago school. Army men are at the Memphis school... and the Los Angeles school moved into even larger quarters to accommodate a Navy training program. The New York school has trained men from the Navy... and is now conducting the Diesel training of Coast Guard personnel.

This unmistakeable evidence of the importance of Diesel power and Diesel-trained men in fighting this war justifies the foresight and vision we put into the operation of the Hemphill Diesel schools. We knew ... and you in the industry knew... the Diesel's important role in peacetime progress, and now we know its vital wartime role. It is fortunate that so

many civilians were equipped with Hemphill Diesel training because they are now filling important posts in the four corners of the earth...and even more fortunate that Hemphill Diesel schools have the extensive facilities so urgently needed by our Army and Navy at this time.



Contractor to the U. S. Army and U. S. Navy

HEMPHILL SCHOOLS, Inc.

3128 QUEENS BOULEVARD, LONG ISLAND CITY, NEW YORK

MEMPHIS

Homphill Diesel Schools also located at

CHICAGO 515 So. Western Ave. LOS ANGELES

AMERICA'S ORIGINAL EXCLUSIVE DIESEL TRAINING INSTITUTION



gun power needs manpower and machine power. To keep CONSTRUCTION equipment meeting today's stepped-up program use . . .

SINCLAIR
SPECIALIZED OILS
and GREASES. These
lubricants are designed to
keep machinery giving top
yield . . . continuous service
hours under the most punishing load or emergency
overload conditions.





SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE SINCLAIR REFINING COMPANY (Inc.)

2540 WEST CERMAK ROAD CHICAGO 10 WEST 51ST STREET NEW YORK CITY RIALTO BLDG. KANSAS CITY 573 WEST PEACHTREE STREET ATLANTA FAIR BUILDING

SHOW 'EM YOU ARE CONSERVING

Hundreds of operators on shovels, bulldozers, tractors, scrapers and trucks are proudly displaying this red, white and blue 5" diameter emblem. It means they are conserving their particular construction equipment, making it last longer. Won't you join their ranks? A postcard with your name and address will bring you one or more free emblems.

LORAIN DISTRIBUTORS

If you can't get new equipment, you'll have to take care of what you have

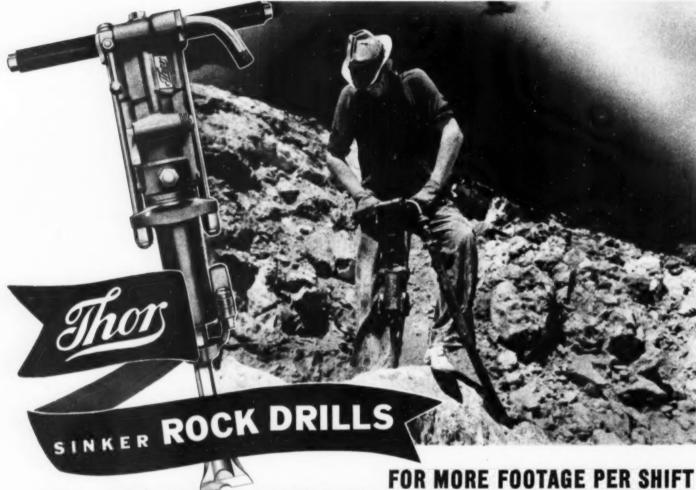
TT'S your problem and ours tool And it's got to be licked. Equipment must last longer—emergency repairs must be made quickly, with a minimum use of critical, hard-to-get materials.

This new Thew Emergency Fix-It Handbook will help many Lorain owners answer the problem. It's a handy repairman's guide, covering all Lorain Models. It describes practical methods for making emergency repairs and how to salvage worn or used parts.

Your copy will be mailed the day we receive your request. Write for the Fix-It Handbook now!

THE THEW SHOVEL COMPANY LORAIN, OHIO





ON TOUGH, DOWN-HOLE DRILLING

Thor Sinker Rock Drills in every weight class have an extra margin of power that means the difference between ordinary and outstanding footage on down-hole rock drilling. They hit hard and fast because they actually use most effectively ALL of the air that enters the machines. Basic reason for this is the patented Thor short-travel, tubular valve (with a controlled tolerance of .00025") that measures and admits exactly the right amount of air for peak operating efficiency.

Positive Control — High Average Drilling Speed

Thor's precision valve action, plus a quick-acting throttle valve, gives drill runners positive control for all operating conditions. This means powerful rotation for hole starting with quick acceleration to top speed for drilling and plenty of air for clean hole blowing. Results — high average drilling speed and *more* holes per shift.

Easy Holding — Sturdy Construction

Just as Thor's principle of "Measured Air" assures full efficiency and control, so also does it provide easy handling. With every stroke powered by the same amount of air, operation is smooth and uniform. Naturally, minimum vibration contributes to longer life, as do the air-cushioned retainer, automatic lubrication and dropforged steel construction. Today, on scores of road building, shaft-sinking, tunnelling and other projects Thor Rock Drills are delivering more footage per shift.

For All Your Portable Tool Needs - ROCK DRILLS, PAVING BREAKERS, SHEETING DRIVERS, CLAY DIGGERS, BACK FILL TAMPERS, SPIKE DRIVERS, CONCRETE SURFACERS, SAWS, HAMMERS, DRILL STEELS, DETACHABLE BITS, HOSE AND HOSE FITTINGS



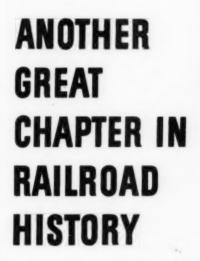
Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO, ILL.
Branches in Principal Cities

A THOR SINKER ROCK DRILL FOR EVERY DRILLING JOB 7 standard models for light, medium or heavy duty work in the most popular weight classes. Other types available for special applications. MODEL NO TYPE OF SERVICE WEIGHT CLASS 38 Light Duty 39 45 Lb. Auger Drill 70 Series 45 Lb. Medium Duty 85-B 55 Lb. Heavy Duty 80 Lb.



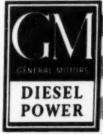
Here Currier and Ives, the famous portrayers of American life in the past century, picture their idea of the ultimate in convenient travel—a train of the 70's rolling through the cut outside Jersey City and linking the bustling metropolis with the then distant towns that now are merely substituted.

Today GM Diesel Locomotives speed passengers from C cago to Los Angeles, 2227 miles, in 41% hours, a business-day faster than in the middle nineteen thirties. In recent war emergencies GM freight locomotives on the Santa Fe have been an important factor in the rapid movement of precious war material between Chicago and the Pacific Coast.

THE history of America is a history of progress in transportation. * This history is not completed. * General Motors locomotives have turned a new page in this record of progress. * The flowering of this new era when peace again returns is foretold in the tremendous strides already taken in meeting the challenges of war today.



Reconstruction and new construction are going to need plenty of this hard-bitting, easy-onthe-fact power. With normal refinement and development speeded up by war, with production expanded, GM Diesels will be ready to serve in more fields and in more ways than ever.



ENGINES .. 300 to 2000 H.A. . CLEVELAND DIESES ENGINE DIVISION, Claveland, Ohio

EMERIES 15 to 250 H.F..... . ORTROIT DIESEL ENGINE DIVISION, Dutroit, Mich.



TO HAVE SERVICING HANDLED IN **DEALER'S SHOP!**

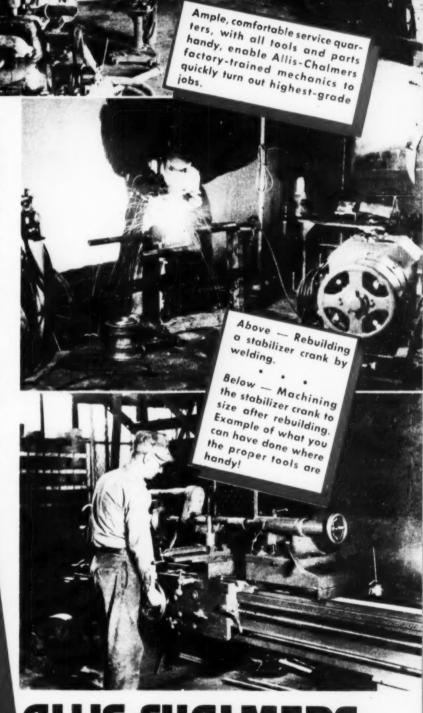
Common sense tells you, you will get superior workmanship if your equipment servicing is handled under ideal conditions. That is why more and more equipment owners are hauling their units into Allis-Chalmers dealer shops for repairs, rebuilds, replacements. They are taking care of their hard-to-replace machinery . . . the best way . . . the shop way! Dealer mechanics, working in comfort, with proper illumination, the right-type tools and genuine parts . . . plus the expert help and advice of the shop foreman, can speedily turn out better jobs. Delicate Diesel parts are handled more carefully, too, in clean surroundings!

Next time your outfits need servicing . . . try this better, faster, shop plan. It will repay you many times over! Your machines will be back to work about as soon . . . will be ready to put in many extra hours of work with less downtime. Call your Allis-Chalmers dealer. Make arrangements to haul 'em in!

WARTIME SERVICE FROM YOUR A-C DEALER

- PARTS ASSISTANCE In-PARTS ASSISTANCE formation on availability of parts and how to obtain them.
- PRIORITY ASSISTANCE Who can get new equipment and how! Up-to-date information on latest regulations.
- 3 LIMITATION ORDERS Interpretation of latest government limitation orders affecting construction equipment.
- 4 SUBCONTRACT INFORMATION Frequently dealers possess information on subcontract op-
- 5 REBUILDING FACILITIES En larged, modern shop facilities to handle rebuilding with speed and efficiency

- tions on how to operate and service equipment correctly Provides service school instructors.
- T REPAIRS AND MAINTENANCE - Quick, efficient repairing by skilled, factory trained mechanics, using the right tools and
- SUSED EQUIPMENT In some instances, good rebuilt construction equipment may be
- 9 RENTALS Good used equipment may be available for temporary emergencies
- EQUIPMENT EXCHANGE Information center on used equip ment available in territory



TRACTOR DIVISION-MILWAUKEE, WIS., U.S.A.





1. Teamwork—the fighting formula of American Armed Forces—again sends the Axis reeling! Ball-playing Americans, schooled in team play from sandlot days, know the value of coordination. Guadalcanal, North Africa, a hundred more operations by U. S. and Allied teammates, prove "working together" the secret of success. This American landing barge, carrying out a shipto-shore operation, puts trucks ashore. Both men and machines are vital parts of the "Liberty Team."

2. In truck conservation, it's teamwork that counts most, says H. J. Olson, President of the Olson Transportation Company, Green Bay, Wisconsin. Drivers, mechanics, management must all work as a team — or get out of the game. Olson has a traveling engineer on the highway at all times to help drivers improve their methods and save vehicles, tires and equipment. Every man in the organization knows that these days "every truck is a trust" — and conservation a patriotic duty.

**PLAY BALL" yourself, on the nationwide vehicle conservation team! We have just prepared a new vehicle conservation program for 1943, even more complete than last year's. Operators' aids, driving helps, complete data for maintenance men, a full-color sound film on "TEAMWORK" and other valuable aids to "keep 'em rolling." Representatives of our Motor Transport Cooperative Service Department are showing this film throughout the country on a prearranged schedule. If you want to get the most out of your vehicles, write us today and arrange for a showing of this film to your organization. There is no charge or obligation.



TIMKEN AXLES

THE TIMEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN



"What is Synergism?" you well may ask. To put it succinctly, you might say that synergism is the force that can make 2 + 2 = 5.

Synergism is not a new word. It has its roots in the classic Greek (Suv-together; Epyov-work) and has long had its connotations for the chemist, the doctor and the theologian. Basically, it always has meant forces working together to produce a whole greater than the sum of the parts.

Now, "Synergism" emerges, in its larger sense, with a meaning for industry, bred of war accomplishment.

For the miracles of war production are in no small part due to the meeting of minds, working together as a creative stimulus-minds that "click," as we call it on the street-so that the net result is always greater than the sum total of the individual ideas. From synergistic thinking, evolve the great mechanisms, the new synthetics, the magnificent product creations which comprise materiel for Victory.

Synergism may apply to individuals working together, to groups, to companies-across a table, in the laboratory, in the field. It is the newer concept for industrial mentality. Now, as never before, it is evident that industrial progress revolves about the stimulus created by minds working together to "click" creatively. Synergism is a much needed component for post-war development-not as an abstract philosophy, but as a practical working force.

Here at Atlas, we are "Synergism-minded." In our own fields of chemical endeavor, we have acquired a degree of expertness which can be applied synergistically to products now to create results far beyond present design expectations. Add synergism to cooperation and miracles become commonplace.

We would like to talk with you.

ATLAS POWDER COMPANY

WILMINGTON, DELAWARE

Offices in Principal Cities

Industrial Explosives **Activated Carbons**

Industrial Finishes

Industrial Chemicals

Coated Fabrics Acids

Copyright 1943, Atlas Powder Company

Ordnance Materiel

ENGINES "LIKE NEW"





TUNE IN FRED ALLEN EVERY SUNDAY NIGHT-CBS

at Each Oil Change!



YOU will get thousands of extra miles of service between overhauls when you lubricate your heavyduty engines with Texaco Ursa Oil X**

Texaco Ursa X ** possesses not only detergency, but dispersion properties. Detergency means cleaning engines of old deposits. Dispersion means that carbon and other deposit-forming materials do not settle out in the engine, but remain in suspension, draining away when the oil is changed, thus keeping screens and oil-ways clear.

Texaco Ursa X** also possesses high film-strength, assuring protection against scuffing of rings and cylinders . . . also protects modern precisiontype alloy bearings. Its use assures full power and substantial fuel economy.

For quieter-running longer-lasting transmission and differential gears, use *Texaco Thuban*.

So effective have Texaco Lubricants proved that they are definitely preferred in many important fields, a few of which are listed in the panel.

These Texaco users enjoy many benefits that can be yours. A Texaco Automotive Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

* More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

* More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

* More stationary Diesel horsepower

in the U. S. is lubricated with Texaco than with any other brand.

* More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



They also serve AVIATION who never leave the ground

It takes much more than gasoline to get a plane aloft and bring it safely back.

Among the myriad items on which aviation leans is cement — ordinary, everyday, hard-working cement.

It has been Lehigh's privilege to supply cement for our air defenses, both at home and abroad for important construction such as new airplane plants, new flying fields, runways, new piers for seaplanes. Often it was Lehigh Early Strength Cement that got the call; for its ability to make service-strength concrete in ½ to ½ the normal time is a big asset in war-time work. In winter this time saving is particularly important. It reduces the danger of frost

CEMENT

damage, reduces heat protection time . . . and cuts cost.

Fire

prot

avoi

chin

K

For better, denser concrete for war or civilian projects—at speed that means more safety in winter, more economy all year 'round—use Lehigh Early Strength Cement. The Lehigh Service Department, is always at your service, with data or counsel.

LEHIGH EARLY STRENGTH CEMENT for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY . ALLENTOWN, PA. . . CHICAGO, ILL . . . SPOKANE, WASH.



It's the many extra qualities built into all "Caterpillar" Diesel Engines that are proving their worth today. They're simple, dependable, as nearly free from operating adjustments on the job as possible. But if you expect to get the utmost out of your engine, it's up to you to do your part.

First of all, you should read the instruction book and re-read it

Lubrication is important to engine life. Use the correct grade of oil, and change the oil and filters at proper intervals, as indicated by the hour-meter.

Keep the fan belt properly adjusted.

See that the cooling system is tight, and put in enough anti-freeze to give positive protection in winter weather.

Keep the air-cleaner clean, and remember it needs more attention if dust conditions are bad.

Keep the clutch properly adjusted to avoid slippage, and don't overload the machine oftener than is absolutely necessary. When repairs or special adjustments are needed, your "Caterpillar" dealer is ready day or night to help keep your engine working. He is equipped for every type of service.

He'll install new rings or recut piston ring grooves and put in wider rings if grooves are badly worn.

He'll etch cylinder liners, removing gum and glaze.

He'll replace bearings when they are worn, and he is equipped to recondition a worn crankshaft and fit new bearings, saving many pounds of war-needed metal.

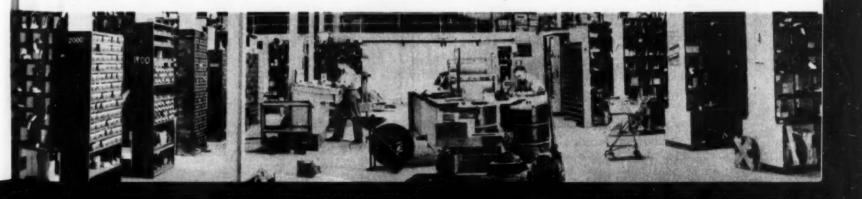
Have him test your fuel injection system to see if it is functioning properly.

The "Caterpillar" dealer is the best friend your "Caterpillar" equipment has. Wartime conservation of power and materials is his job and he's doing it well. You can count on his sound advice and reliable service.

CATERPILLAR DIESEL

CATERPILLAR TRACTOR CO. . PEORIA, ILLINOIS

TO WIN THE WAR: WORK-FIGHT-BUY WAR SAVINGS BONDS!





Orficial U. S. Army Photo

Here's What It Takes To Build Your Glory Road

When a Colonel of engineers said the new Alcan Highway—the "Glory Road of America"—was built by "guts and tractors" he stressed the former.

ALTER EGO: And how right he was! When tough "competition" from the west threatened to annihilate us, it jolted us into super-action. Alcan's 1800-mile route through uncharted wilderness — said to be impassable — was a confusion of mud, mountains and mosquitos. Under the spur of Jap "competition", we finished this "glory road" in one season.

Maybe that's a lesson for us to be on the alert for the tough competition that'll invade all business after the war. Let's jolt ourselves into super-action now.

ALTER EGO: Right! We've got to hack through plenty of uncharted wilderness that seems impassable . . . with little time on our hands . . . and come out with better products and lower costs than the other fellow. Will-power and ingenuity will build this "glory road".

We have the will-power. Let's acquire the ingenuity by improving our welding knowledge with Lincoln's aid.

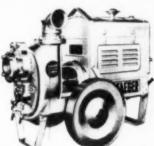
Ask your inner self if welding knowledge isn't the shortcut to postwar success.

THE LINCOLN ELECTRIC COMPANY . CLEVELAND, OHIO



as Well as Profit

2" AND 3" HEAVY DUTY PUMPS: Finest engineered small pumps stand high pressures, continuous



AND 6" PORTABLE PUMPS: Big capacity (up to 90.000 G.P.H.) and years of service in compact, easy handling units.



PUMPS: Huge air and water capacity (125.000 to over 200.000 G.P.H.), plus unequalled compact-

AND 10" BIG CAPACITY EGER

TWO JAEGER PAVING TEAMS Lay 11,500 Linear Ft. of 10 Ft. Slab in 12-Hour Shift!



To build the latest stepping-stone to Europe, in a remote land without roads, McNamara Construction Co., Ltd., chose Jaeger Concrete Screw Spreaders and Jaeger Type 'H" Finishers to team with two 34E pavers—worked 24 hours a day to complete 623,000 sq. yds. of 6" concrete runway in 10x100 ft. slabs-reached production rate as high as 13,000 sq. yds. (11,500 linear ft.) per 12-hour shift. Runways, which measure 200x6000 ft., already equal 53 miles of 20 ft. roadway-will constitute one of world's largest fields when extensions are completed.

All equipment, including complete machine shop and gravel plant, workmen, materials and supplies (except local aggregate) had to be brought in by ship thru submarine-endangered waters open to navigation less than half of the year—a testimonial to the difficulties of the operation, the efficiency of its organization and the dependability of the equipment selected.

> FOR HELP ON YOUR OWN PAVING, MIX-ING AND PUMPING PROBLEMS, CONSULT YOUR JAEGER DISTRIBUTOR: He offers proved machines and methods, knowledge of job layout and local conditions, complete repair parts and service to keep your equipment in top shape.

> > JAEGER "SURE-PRIME"- THE PUMPS-THAT EXCEED THEIR PROMISES: Only pumps that, for years, have been individually tested and certified for vacuum, capacity and pressure and regularly exceed this guaranteed performance—with up to 5 times faster priming. high air and water capacity under adverse conditions and

thousands of extra hours of service. High pressure shell construction, replaceable liners, longest life seal. hi-head. hi-capacity impellers, oversize shafts-3000 to over 200,000 gallons capacity.

JAEGER

SPEEDLINE TRAILER

MIXERS

p to 14S ize have

size have machined steel drum tracks, auto-

motive -

type trans-mission.

"Piles" of Work Well Done—and quickly—with MONOTUBES

Today, when speed plus sound construction is a must on every job, you'll find more all-steel tapered Monotubes preferred —for the installation of cast-in-place concrete piling.

And here are four sound reasons why:

FIRST—Monotube steel casings are light in weight, permit FAST and ECONOMICAL HANDLING.

SECOND—Monotubes are so strong and rigid they require no heavy core or mandrel and can be SPEEDILY DRIVEN with average job equipment (crawler crane equipped with standard leads and hammer).

THIRD—The use of extendible Monotubes permits SPEEDY INSTALLATION of VARYING PILE LENGTHS without delay or waste even in low headroom.

FOURTH—The hollow tubular design of Monotubes enables you to INSPECT CASINGS QUICKLY and thoroughly from top to toe before concreting.

Monotubes are available in gauges, tapers, and lengths to meet varying soil conditions, and Union Metal engineers stand ready to give you constructive help with your piling problems. Write for your copy of the Monotube Catalog 68A containing additional valuable information.

THE UNION METAL
MANUFACTURING COMPANY
CANTON, OHIO





EMERGENCY REPAIRS

for ATHEY Equipment

EVERY MACHINE of yours in full production is an implement of war fighting the Axis.

That's why emergency repairs have been developed to help you keep your Athey Equipment going. You can now recondition certain parts in Athey Forged-Trak Wheels and make a considerable savings in critical material for the war effort. Many of these repairs can be made by welding, thus avoiding excessive downtime. Nearly all Athey-"Caterpillar" Dealers have complete welding facilities and necessary equipment to do these repair jobs for you. Your dealer also has skilled servicemen and especially designed tools to make fast work of every equipment reconditioning job.

See your Athey-"Caterpillar" Dealer, or write us for our new descriptive manual "Care and Repair Tips."

YOU'LL BE SAVING STEEL AND MAKING YOUR ATHEY EQUIPMENT SERVE LONGER

BUILDING UP TRACK RAILS

When track rail surfaces become worn, they can be built up to original rail thickness by welding. To get longest life and

efficiency from your Athey Wheels keep track rails in good condition.

RENEWING TRACK SPINDLES

Spindles may be salvaged by welding worn surfaces and machining to proper size. You can thus conserve critical material, maintain steady



maintain steady production with present equipment.

ADDING LIFE TO WHEELS

Many owners report satisfactory results in welding new rims on Athey Wheels—another measure of wartime conservation.



RESTORING TRACK HOOKS

After long operation, the track hook will show wear. This part, too, may be reconditioned by welding and grinding.



For more detailed instructions, get in touch with your Athey-"Caterpillar" Dealer or write us direct.

Athey

TRUSS WHEEL CO.

CHICAGO, ILL.



HELPING TO BUILD A TOWN FOR WAR WORKERS!

Here—at Kingsbury, Indiana—this Link-Belt Speeder Dragline is "doing its bit" to help win the war.

Building one of the largest housing projects for defense workers, the Allied Construction Co. is using this fast and powerful unit for the handling of sand, gravel and crushed stone needed for the building of miles of sidewalk.

There are good reasons why Link-Belt Speeder Built-for-Service machines are the choice of contractors who have got to make good—and on time.

LINK-BELT SHOVE SPEEDER

SHOVELS -

DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.

Roosts for Warbirds

BLAW-KNOX EQUIPMENT
HELPS CONSTRUCTION
BATTALIONS BUILD
VITAL BASES ALL OVER
THE WORLD

Picked men and picked equipment are today building roads and airfields and other structures in many a far-flung American outpost.

The tools of America's construction battalions are the same favorite tools of the construction industry. Blaw-Knox Finishing Machines, Concrete Spreaders, Road Forms, Bulk Cement Plants, Batcherplants, Clamshell Buckets, Tamping Rollers, Standard Steel Buildings, etc.—are helping to build these springboards to victory.



BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO. 2086 FARMERS BANK BLDG. PITTSBURGH, PA.

NEW YORK . CHICAGO . PHILADELPHIA . BIRMINGHAM . WASHINGTON

Representatives in Principal Cities



We have two reasons to be proud of this Flag

First, of course, we are proud of the Army-Navy "E" flag because it is an award to the 3,000 employees of our Richmond refinery. We have long known that their energy, devotion and skill merit the highest praise.

The other reason is that this flag is a harbinger of better days to come, when we will take pride in offering to industry the fruits of Richmond's tremendous war effort.

Today we can only hint at the giant strides our petroleum research and production have made. We cannot publish the specifications of a host of new products, nor the story of how old products have been sensationally improved. We cannot describe the system by which these products are distributed on a world-wide scale.

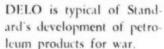
But we can promise you that, when these facts become known, they will open new horizons for American businessmen and technicians in many fields. They will prove once again that "know-how" can turn yesterday's impossibilities into tomorrow's accomplishments.

In the meantime, the Richmond refinery and all of Standard of California are living up to the "E" flag, helping bring the inevitable victory nearer.

STANDARD OIL COMPANY OF CALIFORNIA



RPM DELO IS USED IN U. S. NAVY DIESELS First used in submarines, RPM DELO performed so well that it is now also used to lubricate high-speed Diesels in the Navy's mine sweepers, sub-chasers, landing barges, patrol boats and ocean-going tugs. In all these vessels it is licking some of the toughest lubricating problems in the world. RPM





RPM DELO is marketed under the following names:

RPM DELO · Callex RPM DELO · Kyse RPM DELO
Signal RPM DELO · Imperial RPM DELO · Schic RPM DELO

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity



Load LeTourneau Carryalls and Tournapulls Downhill; Use "Wrinkle" Loading Method; Break up Hard Cuts with Rooters.

See how these job-proved methods enable you to get bigger loads and more of them quicker with tractor-drawn LeTourneau Carryall Scrapers and with Tournapulls:

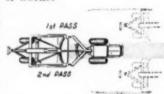
LOAD DOWNHILL

Loading downhill, wherever possible, offers you many advantages . . . creates greater drawbar pull when using older, less-powerful tractors . . . gives practically same help as pusher loading when pusher tractors are not available. In any case, you get bigger Scraper loads quicker.

TRY THIS NEW LOADING "WRINKLE"

Many smart contractors shorten loading time by using the "wrinkle method". Here's how it works:

Make the first two Scraper cuts 4 or 5 feet apart. This loosensthe dirt between.



Then, on the third cut load down between the first two passes, picking up the ridge, or "wrinkle" of loosened material. Results: faster, easier loading. Try this jobtested method on your job. The accompanying diagram shows you how. Pusher loading a Super C Tournapull downgrade reflects smart job planning on this Pennsylvania airport construction. Contractors Mashuda and Collins used 4 of these Super C Tournapulls here and a fleet of tractor-drawn LeTourneau Carryalls and Dozers.

ROOT TOUGH MATERIALS

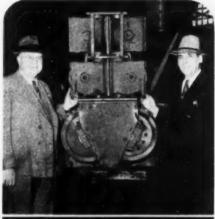
LeTourneau Rooters increase the materials your Scrapers and Tournapulls can profitably handle, by making easy-to-handle scraper dirt of all tough materials, save solid rock . . . same time, eliminate blasting. Again, you increase the yardage you can handle . . . and reduce tire wear and Tournapull and Scraper maintenance. By hooking a Rooter to your pusher tractor, for rooting between loads, you can help solve your own tractor shortage problem.

Try these yardage-increasing LeTourneau methods NOW. See for yourself how they help you get more done more profitably with your present LeTourneau equipment.

ANOTHER TIME-SAVER — DEALER SERVICE

Your local LeTourneau-"Caterpillar" dealer can furnish you with many more job-planning ideas for getting maximum yardage and lowest costs with LeTourneau equipment. He also has parts and factory-trained servicemen to keep your equipment working at full efficiency for Victory. Make him your Victory Construction Headquarters. Call on him any time you need help on job planning or equipment service.





This Army-bound Power Control Unit is the 30,000th produced by LeTourneau. That's more than any 4 other makes put together — proof by customer preference that successful earthmovers find LeTourneau PCU's keep men and tractors working profitably. They'll do the same far you.

LeTourneau Power Control Units Enable You To Get Greater Use From Your Tractor Power

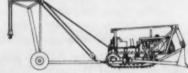
LeTourneau Carryall Scrapers and Rooters, like all LeTourneau tools, are controlled by fast-acting cable operating through a Power Control Unit mounted on the tractor. LeTourneau Power Control Units enable one man to operate both tractor and equipment from the tractor seat. They make it possible, too, for you to change your tractor from one tool to another to meet changing job requirements — see illustrations below for some of combinations.



Both Dozer and Rooter can be operated



Here Carryall Scraper is controlled through 2-drum, rear-mounted PCU; Dozer from front-end PCU.



Crane operates from 2-drum; rear PCU, Dozer from front-end unit in this combi-



Here front-end PCU operates Dezer, thus leaves rear of tractor free for mounting heavy-duty winch or for drawbar work.

THIS PIPE CAN TAKE A SOCK ON THE NOSE!



Is it your problem to provide adequate airport drainage under shallow cover? If so, here's a ready answer. Flexible ARMCO Metal Pipe (plain or perforated) has proved ability to resist crushing, cracking or disjointing under the impact and weight of heavy loads.

This means freedom from failure. You have continued assurance of a firm, dry field with uniform support for runways or direct wheel loads. Operations are safer and practicable the year round. Even the effects of a heavy storm are only short-lasting.

ARMCO Pipe has the added advantage of being shatterproof—an important point in case the field becomes a military objective. Unskilled labor can easily make the installation, using long lengths joined together with sturdy band couplers. Shifting soils and severe frost action are no hazards.

Consider Armco Corrugated Metal Pipe when you are planning or building essential war-time airports. Be sure to ask your local Armco man to show you the Manual of Airport Drainage. Or write to us direct regarding specific drainage problems. Armco Drainage Products Assn., 145 Curtis Street, Middletown, Ohio.



ARMCO



CORRUGATED PIPE

ICK-SAWING War Tempo The Black & Decker Way



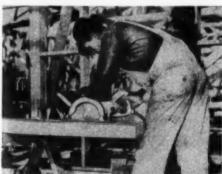
CUTTING THROUGH STONE QUICKLY, CLEANLY



SPEEDING UP STAIR STRINGER CUTS



SAWING TOUGH ASBESTOS-CEMENT MATERIAL



SLASHING THROUGH HEAVY STRUCTURAL TIMBER

THE sawing operations illustrated here show why big scale contractors specify Black & Decker Electric Quick-Saws when precious production minutes count and war construction deadlines must be met. Powerful, flexible B & D Saws are built to blaze through beams or flooring, rafters or planking . . . in wood and plastics . . . ten times as fast as these sawing jobs could be done by hand.

Three models of this speedy B & D Saw are available for practically every sawing job. They're all Universal . . . can be plugged into any electric socket or portable generator. They're absolutely safe with instant-acting, telescoping blade guards and instant-release safety switches. They pack plenty of power . . . with reserve capacity to take the tough spots without overheating or slowing up. Housings are light, strong, perfectly balanced . . . for easy, accurate handling. Black & Decker Quick-Saws can stand the gaff under hard, continuous running.

On all kinds of war construction work, Black & Decker Portable Electric Tools do jobs faster and better, require less man power to do them. Contractors prefer Black & Decker Tools because they can be bought on the job from nearby distributors in all leading cities. They like them because there's a Black & Decker Factory Branch close at hand, ready to provide quick, expert service. The Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson, Maryland.





RIPPING THROUGH FORM LUMBER EASILY



RABBETING DONE QUICKER AND EASIER

Timely Tips for Contractors

- cated, oiled, cleaned . . .
- "Know" your tools and Throw idle scrap metal, old good shape. Well lubri- have your men "know" them tools, obsolete equipment better. Send for new "Know into the fight. Uncle Sam check over it regularly. How" handbooks on proper needs all you can give him
- New tools are hard to get. care and use of electric tools. now to win this war.
- Saw Handbook Hammer Handbook Proper Use & Care of Drills

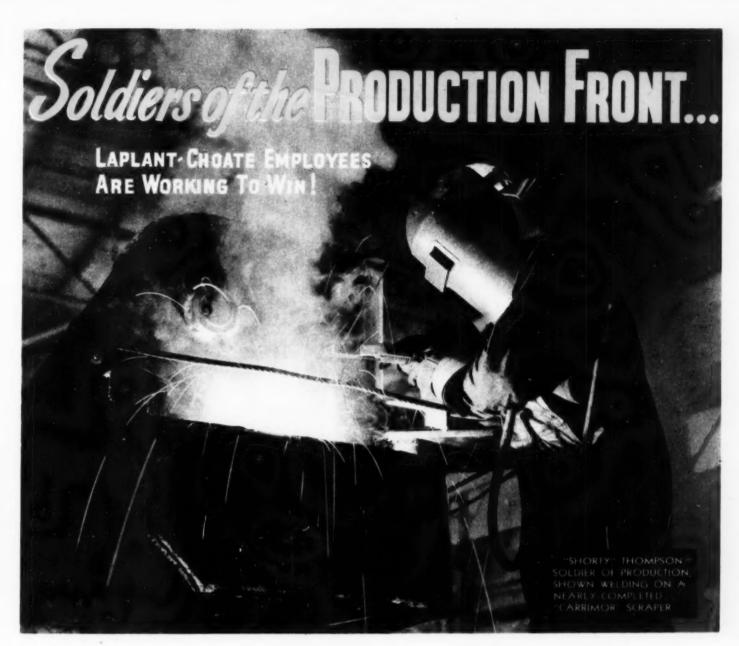
GET IN THE SCRAP WITH YOUR SCRAP



Illustrated at the left is the 150 hp. Model H Cummins Dependable Diesel. This engine's economy, stamina and flexibility have been proced in all types of construction and material handling operations, in trucks, shovels, compressors, etc. With the Models A, HS (supercharged) and L, it gives you a complete line of dependable power for CHEAPER YARDAGE-33 to 250 hp.

Crucial months lie ahead. More work will be demanded of your Cummins Dependable Diesels than ever before. New engines will be hard to get for reasons which you well understand. This simply means that your present Cummins Diesels must carry the load . . . and they will carry the load providing you make service your keynote

This doesn't mean, however, that you will have to pamper your Cummins Diesels. They were built for tough jobs and 24-hour duty and they will give you this kind of performance indefinitely if you will observe these cardinal rules: (1) Keep your engines clean; (2) Don't tinker; (3) Adopt a regular schedule of preventive maintenance; (4) Follow the recommendations in the Operator's Instruction Manual; (5) When in doubt, always consult your Cummins Dealer.



LaPLANT-CHOATE Soldiers of Production produced more fighting equipment in the past year than in any previous period in company history. And they'll keep on breaking newly established production records. LaPlant-Choate Bulldozers, Trailbuilders, and "Carrimor" Scrapers are being built better and faster by these loyal workers . . . for they're producing to win!

Your LaPlant-Choate "Caterpillar" distributor is fighting, too. He is making every unit work a full 24-hour schedule wherever possible. Speeding parts and repair trucks to your job when trouble does develop is his specialty. He'll "move heaven and earth" to keep your equipment producing. Go to him for fast, efficient, and courteous service. He'll be happy to serve you—and through this service he aids our war effort.



For a liberally illustrated booklet describing LaPlant-Choate Forced Ejection "Carrimor" Scrapers, visit your nearest LaPlant-Choate "Caterpillar" distributor or write directly to the factory at Cedar Rapids, Iowa.

> LaPlant-Choate employees are proud of their 10% Flag. Invest 10% of your income in Wor Bonds.

LAPLANT-CHOATE Factory & Home Office Manufacturing Co. INC. Pacific Coast Office San Leander Cal



DON'T TELL GOODYEAR WHERE OR WHY-ONLY WHAT AND HOW

These are times when the moving of mountains is hush-hush, everyday work for off-the-road equipment. The operator who wrings the maximum ton-miles from his tire certificatesand his money-is doing right by his Uncle Samuel.

In war and peace-for more than twenty years-more Goodyear tires than any other kind have been bought for big jobs. Why be satisfied, especially in wartime, with anything but the proved best?

Records indicate conclusively that Goodyears deliver the most tons farthest per dollar - both before and after recapping.

Because the Goodyear line includes special treads for every type of operation-rock, mud. snow or dirt-you can tire your equipment with the right traction-getter and load-carrier for the job at hand.

Pick out the Goodyear that fits your job and see your dealer about it today. Extra ton-miles, remember, can buy more War Bonds.

P. S. Goodyear's free Truck Tire Engineering Service helps you answer Rationing Regulation questions. Your Goodyear dealer is equipped to schedule speedy and efficient "on-the-spot" tire inspections to save you time. He can arrange for recapping all sizes of off-theroad tires by factory methods that insure maximum extra service.

Sure tirip, All Weather T.M.'s The tirodyear Tire & Rubber C

- 1 GOODYEAR HARD ROCK LUG for all rock work
- 2 GOODYEAR SURE-GRIP GRADER for mud and marsh
- 3 GOODYEAR ALL-WEATHER EARTH MOVER for drawn dirt-movers



Page 44 — CONSTRUCTION METHODS — March 1943

Construction Methods

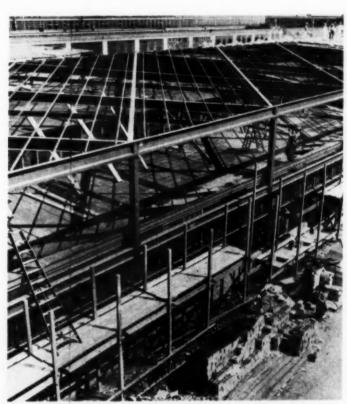
ROBERT K. TOMLIN, Editor

Volume 25

MARCH, 1943

Number 3

Welded Diamond Grid REDUCES STEEL IN ROOF FRAME



WELDED DIAMOND GRID of structural members forms rigid continuous roof frame of 85-ft. span for new building inclosing old laboratory which continues uninterrupted activity throughout construction of its new home Roof pitches slightly toward two edges from center beam.



WELDED CONNECTIONS at columns and intersections fuse roof members into rigid continuous frame. Purlins are welded on roof frame to support poured gypsum roof.

WELDED DIAGRID construction of a roof frame unsupported by interior columns cut steel requirements 30 percent for a new laboratory of the Westinghouse Electric & Manufacturing Co. and reduced overall building height by 6 ft. in comparison with an alternate design using roof trusses. The steel-frame structure is roughly 85 ft. wide by 270 ft. long. To avoid interruption of war research, the new building was erected over an existing laboratory, which it replaces, without disrupting facilities or stopping laboratory work. After the new building had been inclosed with masonry walls and a poured gypsum roof, the old laboratory was removed section by section and housed in its new quarters.

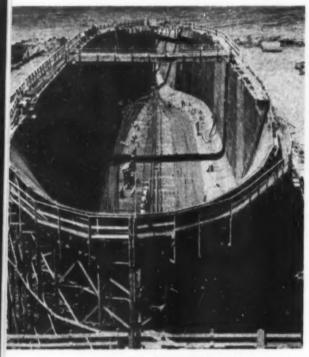
Applied previously with considerable economy to floors and roofs of a number of buildings in Europe, the Diagrid system employs structural shapes welded into a diamond grid pattern to form a rigid continuous frame. Two sets of parallel beams intersecting at 90 deg. are rigidly welded at the junctions. Resulting cooperative action of the members tends to equalize moments and shears on all. Plane (or flat) grids are used for bays of ordinary span. For the 85-ft. roof of the Westinghouse laboratory, the

(Continued on page 136)



EASTERN EXTENSION of "Big Inch" oil pipe line to relieve fuel shortage on Atlantic seaboard crosses historic Brandywine Creek, about 40 mi, west of Philadelphia, on route to eastern terminus at Phoenix-ville, Pa., from which branch lines take off to refineries in New York and Philadelphia areas. First 530-mi, section of 24-in. pipe is now carrying oil from Longview, Tex., to Norris City, Ill., for loading into railroad tank cars. Eastern connection, scheduled for completion in June, will permit pumping of 300,000 bbl. per day through 1,250 mi. of 24-in. pipe.

THIS MONTH'S NEWS REEL



SEAGOING CONCRETE BARGES for coastal transportation of oil are built rapidly in pre-fabricated forms to meet demand for more ships with minimum use of critical materials. Built in three pours, according to U.S. Maritime Commission specifications, these 14,000-ton hulls are 375 ft. long and 38 ft. deep, with 56-ft. beam. Cargo capacity is 50,000 bbl. Work at West Coast yard is being carried out by Concrete Ship Constructors, combination of Tavares Construction Co., Inc., and Elliot, Stroud-Seabrook.



CONSTRUCTION BURGEE for speed, efficiency and cooperation in carrying out more than 150 contracts at Mare Island Navy Yard is awarded to Barrett & Hilp, San Francisco, as Rear Adm. W. L. Friedell, commandant, and Col. Stuart M. Hall present Army-Navy "E", accepted by Frank Barrett and Harry Hilp for principal contractors and their associate subcontractors. Pins are received by O. S. Hughes, carpenter, representing individual workmen. Left to right: Lt. Comdr. A. J. Wagner, USNR; Lt. Comdr. W. M. Johnson, USNR; Capt. George D. Wetsel, USN; Ens. B. L. Raftin, USNR; Lieut. E. E. Clarridge, USNR; Lt. Comdr. F. W. Phipps, USNR; Rear Adm. W. L. Friedell; Lieut. C. H. Darby, USNR; Col. Stuart M. Hall; Comdr. E. W. Andrews, USN ret.; Harry Hilp; O. S. Hughes, employee representative, and Frank Barrett.

NORFORK DAM (below), U.S. Engineer project on North Fork River, tributary of White River, near Mountain Home, Ark., rises toward maximum height of 230 ft. above lowest foundation as 5-ft. lifts are added to concrete blocks, by Utah Construction Co., Ogden,

Utah, and Morrison-Knudsen Co., Inc., Boise, Idaho, joint contractors, under direction of B (Woody) Williams, project manager and superintendent. Gravity structure 2,624 ft. long, with overflow spillway (shown here) of 568-ft. total length, requires 1,500,000 cu.yd. of concrete placed by 5-yd. buckets suspended from two cableways of 2,835-ft. span extending from single head tower to separate movable head towers on top of left abutment, at right. Designed for flood control and hydroelectric power, Norfork will begin delivery of power from initial 35,000-kw. generator in 1944.





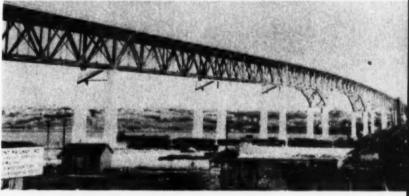
AMERICAN SOCIETY OF CIVIL ENGINEERS' new Board of Direction convenes for first time at annual meeting in New York during January. From lower left-hand corner, reading clockwise around table, new board members are: JOHN W. CUNNINGHAM (John W. Cunningham & Associates, consulting engineers), Portland, Ore.; FREDERICK H. FOWLER (consulting engineer), San Francisco. Callif., THOMAS E. STANTON (materials and research engineer, California Division of Highways). Sacramento, Calif.; CHARLES F. GOODRICH (chief engineer, American Bridge Co.), Pittsburgh, Pa.; CHARLES B. BREED (head, Department of Civil and Sanitary Engineering, Mass. Inst. Tech.), Cambridge, Mass.; SCOTT B. LILLY (chairman, Division of Engineering, Swarthmore College), Swarthmore, Pa.; FRED C. SCOBEY (senior irrigation engineer, U. S. Department of Agriculture), Berkeley, Calif.; DEAN G. EDWARDS (chief engineer, Borough of Manhattan), New York City; REAR ADM. REUBEN E. BAKENHUS (consulting engineer), New York City; GEORGE B. MASSEY (consulting engineer), Chicago, Ill.; COL. WILLIAM N. CAREY (chief engineer, Federal Works Agency), Washington, D. C.; THOMAS R. AGG (dean of engineering, Iowa State College), Ames, Iowa; ERNEST B. BLACK (Black & Veatch, consulting engineers), Konsas City, Mo.: RALPH B. WILEY (head, School of Civil Engineering, Purdue University), West Lafayette, Ind.; NATHAN W. DOUGHERTY (dean of engineering, University of Tennessee), Knoxville, Tenn.; V. T. BOUGHTON (associate editor, Engineering News-Record), New York City; EDGAR M. HASTINGS (chief

engineer, R.F. & P.R.R.), Richmond, Va.; MISS CAROLINA CROOK (headquarters staft); GEORGE T. SEABURY (executive secretary, American Society of Civil Engineers), New York City; EZRA B. WHITMAN, society president for 1943 (Whitman, Requardt and Smith), Baltimore, Md.; WILLIAM D. DICKINSON (president, Dickinson & White, Inc.), Little Rock, Ark.; J. T. L. McNEW (head, Civil Engineering Department, Agricultural and Mechanical College of Texas), College Station, Texas; CHARLES M. SPOFFORD (consulting engi-

neer, Fay, Spotford & Thorndike), Boston, Mass.; GEORGE W. BURPEE (consulting engineer. Coverdale & Colpitts), New York City; and A. M. RAWN (chief engineer and general-manager, Los Angeles County Sanitation District) Los Angeles, Calif. (Absent: JOHN W. COWPER (president, John W. Cowper Co., Inc.), Buffalo, N. Y.; ERNEST E. HOWARD (consulting engineer, Howard, Needles, Tammen & Bergendoff), Kansas City, Mo.; and GUSTAV J. REQUARDT (Whitman, Requardt & Smith), Baltimore, Md.)



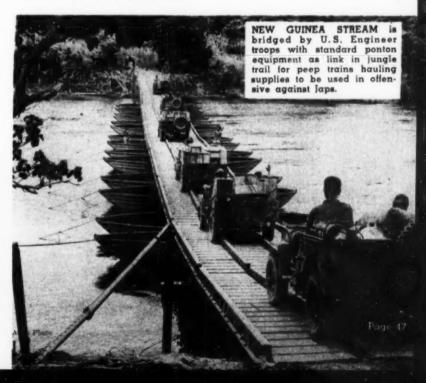
MEDITERRANEAN AIRFIELD on Island of Cyprus British crown colony near Turkey, is constructed with aid of native peasant women, who gather and spread stone for compaction by American power rollers.



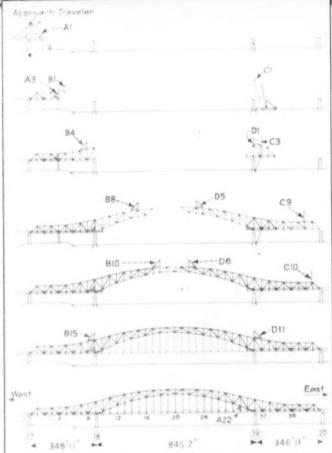
THAMES RIVER BRIDGE opened to traffic by Connecticut Highway Department late last month is high-level bridge with 137½-ft. clearance designed to end congestion caused by frequent opening of swing span in old crossing between New London and Groton. A. I. Savin Construction Co., East Hartford, Conn., built piers, and Harris Structural Steel Co., New York City, erected superstructure of 5,926-ft. total length comprising 1 245-ft. cantilever unit with \$40-ft main span, 2,500 ft of deck truss spans and 2,181 ft. of deck girder approaches. William J. Cox is state highway commissioner, and L. G. Sumner is engineer of bridges and structures.

MISSISSIPPI RIVER BRIDGE (below) 5,760 ft. long, to carry U.S. 20 between Dubuque, Iowa, in foreground, and East Dubuque, Ill., includes three-span continuous truss unit with 845-ft. tied-arch middle span erected by cantilevering and joining two arms of arch prior to adding hangers and tie chords, as described elsewhere in these pages. Bethlehem Steel Co., superstructure contractor; Howard, Needles, Tammen & Bergendoff, engineers.









STEP-BY-STEP PROCEDURE indicates cantilever methods employed in erecting two halves of three-span continuous truss structure with tied-arch middle span. After cantilever arms of arch have been joined at center, erectors add hangers, tie members and deck system needed to make middle span a tied arch.

WITH TOP CHORD CREEPER (below) seated at eighth panel point of arch cantilever, guy derrick on side span sets final steel preliminary to tying down trusses at end pier.

Cantilever Methods

Erect Three-Span

Continuous Truss Bridge

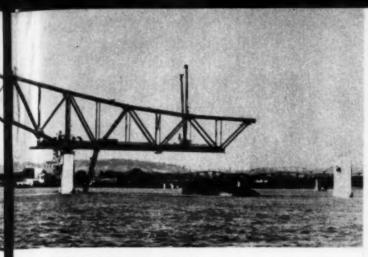
With Tied-Arch

Middle Span

BALANCED CANTILEVER ERECTION (below) proceeds both ways from arch pier, with top chord creeper derrick setting steel in arch arm and mobile guy derrick erecting side span. Carefully equalized loading on two sides of pier puts only light stresses in inclined falsework posts extending from pier base to first panel point of side span.

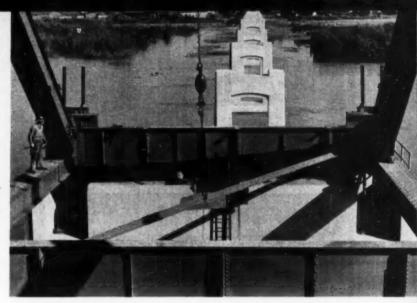






TWO CANTILEVER METHODS, adapted to natural conditions under bridge, are used in erecting east and west halves of three-span continuous truss unit. Straight cantilever erection fits conditions on west half, at left, where side span can be started on falsework bents set on dry ground of river bank. For east half, where deep water flows under side span, balanced cantilever erection over arch pier eliminates need for falsework bents on pile foundations in river.

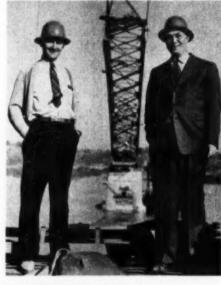
Hruska Phote



AT END PIER, trusses are fastened down with adjustable bolted tiedowns pinned to permanent shoes for rocker links.

ERECTION BY STRAIGHT AND BAL-ANCED CANTILEVER METHODS marked steel construction on the east and west halves of a three-span continuous truss unit, incorporating a tiedarch middle span, for a new highway bridge to carry U. S. 20 across the Mississippi River between Dubuque, Iowa, and East Dubuque, Ill. Making use of erection possibilities inherent in the design developed by Howard, Needles, Tammen & Bergendoff, engineers for the City of Dubuque Bridge Commission, the Bethlehem Steel Co., superstructure contractor, cantilevered the two arms of the arch for the 845-ft. middle span (flanked by 347-ft. side spans) and closed the arch at the center before adding hangers, tie chords and deck system to complete the middle span and convert it into a tied arch.

On the west, or Iowa, bank, where much of the side span is over land, the erectors used falsework bents to start construction from the landward pier and proceeded by straight cantilever beyond the falsework bents to the west main pier and eventually to the center of the arch. For the east half, where the side span is over water 30 ft. deep, the erectors eliminated the need for falsework bents

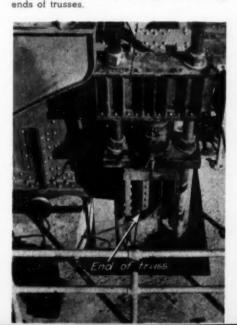


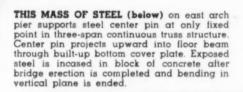
ON INSPECTION TOUR of bridge project, IVAN P. HANSON (left), resident engineer for Howard, Needles, Tammen & Bergendoff, discusses erection progress with CHARLES P. LANDON, chairman, City of Dubuque Bridge Commission.

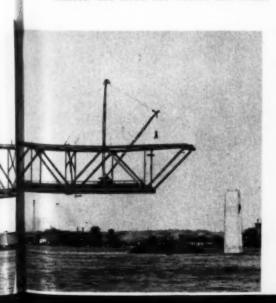


ROLLER SHOES on two arch piers are temporarily fixed in position by steel plates welded to shoes. On west arch pier, shown here, shoes are fixed about 10 in. east of final position to reduce amount of forward movement necessary for arch closure.

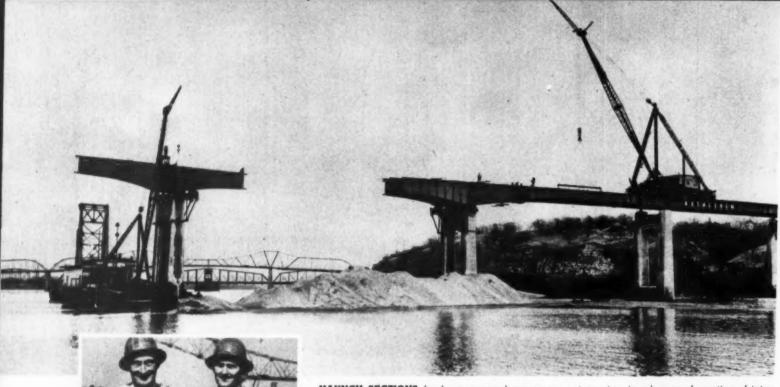
EACH BOLTED TIEDOWN (below) at outer ends of three-span structure incorporates hydraulic jack used in raising and lowering











HAUNCH SECTIONS for long approach spans are set on piers in advance of erection of intermediate girder sections by stiff-leg deck traveler.

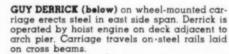
Hrusks Photo-

ERECTION CREWS work under direction of J. E. CAMPBELL (left), superintendent, Bethlehem Steel Co., standing here in bow of launch with IVAN P. HANSON, resident engineer in charge of project.

on pile foundations in the river bottom by employing balanced cantilever methods of erection over the east main pier; the arch arm and the east side span were erected concurrently in both directions from this pier. To make the necessary vertical and horizontal adjustments in the cantilever arms of the arch for insertion of the closure sections, control devices utilizing hydraulic jacks were installed on the end piers at the two outer extremities of the three-span structure.

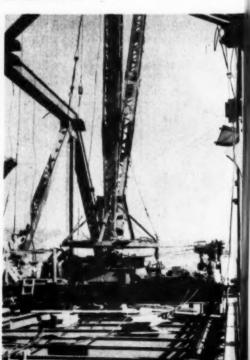
Bridge Design—Choice of a threespan continuous truss structure with a tied-arch middle span, the second bridge of this type to be erected in the United States, was based largely on the erection economy of the design. Because only about 50 percent of the steel for the middle span is in the arch trusses, these trusses required minor strengthening of only a few members to permit cantilever erection. The bridge is riveted throughout, both in the truss spans and in the girder spans of long approaches on both sides of the river. A photograph of the bridge, with steel erection completed, appears in

DOUBLE FALSEWORK BENT (below), adjusted vertically by hydraulic jacks at base, supports west side span at fourth panel point, from which steelwork is cantilevered to arch pier, five panels beyond this point.



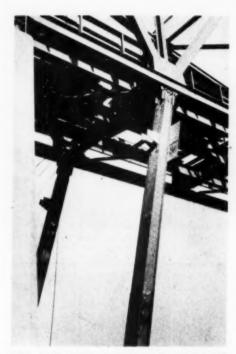






A li

Rich



FOR BALANCED CANTILEVER ERECTION over Pier 19, inclined falsework posts are framed into east side span at first panel point.

the News Reel department of this issue.

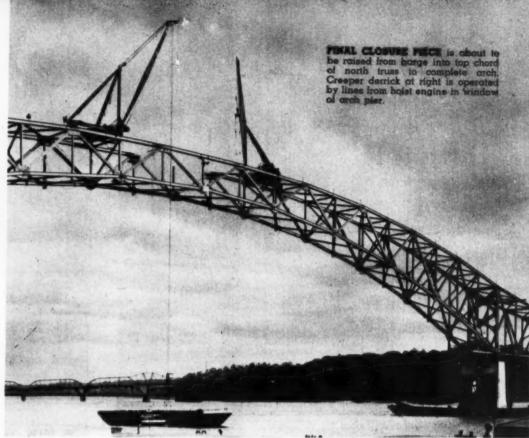
Full load of the truss spans, consisting principally of 4,300 tons of structural steel, is carried by rocker shoes and expansion rollers on the two main piers. At the outer ends of the structure, the trusses rest on rocker links 8 ft. long which allow expansion and contraction movement. Temporary adjustable tiedowns were installed at these locations during the erection of the bridge.

A unique feature of the design is that the three-span structure is fixed (Continued on page 114)

AIR-OPERATED RIVET PASSER (below) delivers hot rivets through tube to riveting gang.
Rivet heater inserts rivet in top of Penflex machine and steps on foot valve to propel rivet upward through flexible metal tube.

Hrusks Photo







EXPANSION JOINT between girder units of bridge approach structure incorporates rocker bearing in web section of girders.



STEEL STRUCTURE gets close attention of W. W. OSKIN (left), resident engineer for Bethlehem Steel Co., and C. R. WEITTEN-HILLER, steel inspector for Howard, Needles, Tammen & Regrandoff.



How TO GET... MORE WORK FROM Bulldozers

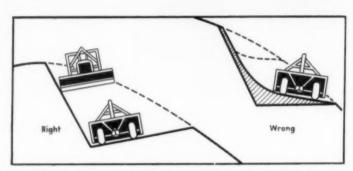
By K. F. PARK, Chief Field Engineer and R. D. EVANS, Field Engineer R. G. LeTOURNEAU, INC., Peoria, III.

AMONG ACCESSORY EQUIPMENT for earthmoving tractors the oldest and the most used, because of its versatility on so many types of construction projects, is the bulldozer. So great a part of the present production capacity of tractors and bulldozers is required by the armed forces that it is imperative these days for everyone working on war construction jebs to get the most out of available equipment. The accompanying illustrations are presented to help operators and superintendents speed up production and get the greatest work possible from their available equipment and manpower through effective use of dozers.

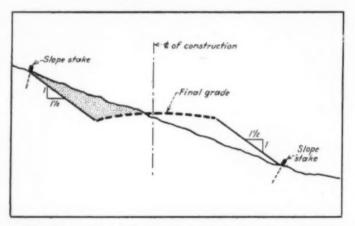
BIGGER PAY LOADS (below) can be built up ahead of dozer if it works downhill in narrow, bowl-wide cut or "slot." Sides of cut act as sideboards and keep material from spilling around ends of dozer bowl, thus increasing yardage removed. One common practice is to take 4 or 5 short cuts at upper edge of slope and then doze all this material down slope in one trip.



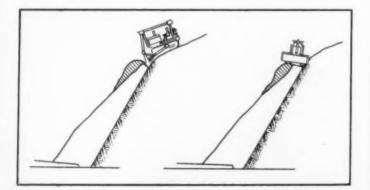




INSIDE OF CUT must be kept lower than outside. Unless this is done, scraper has tendency to work away from slope, thus necessitating subsequent trimming. Left-hand sketch shows how carryall scraper has maintained correct slope on sidehill cut, when cut was started properly at top grade stake, and with inside cut low. Right-hand sketch shows what happens when cut is not started correctly.

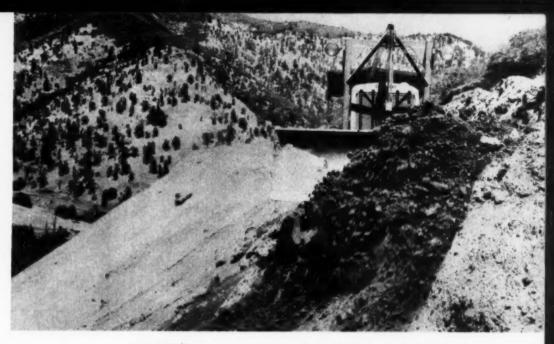


GRADE STAKES are placed at top of slope on cut and at bottom of fill, so that operator can determine slope of cut easily. Cut should always be started at high point on back slope. Earth removed can be placed immediately at lowest point in fill, and will need no further handling. If it is difficult to build shelf, cut can be started as shown below by dozing downhill to place shoulder fill for bench on which tractor can make first sidehill pass.





USED SIDE BY SIDE two or more dozers give extra yardage of earth with each trip. This extra material rolls along between each two dozers to add many yards to pay dirt during course of opera-



SIDE-HILL CUTS may be started with bulldozer, or, if hill is not too steep, with carryall scraper. Dozers are better adapted to this work, however, and should be used, if possible, even if subsequent cut is to be made with scraper. Dozer can start sidehill, insloping cut and in few minutes build shelf wide enough for scraper, eliminating difficulty scraper might have in starting cut correctly. Unless grade is cut right, it is impossible to maintain slope during cut. Photograph shows dozer starting sidehill cut correctly. Note completed level grade behind dozer.



ROCKY EXCAVATION WORK can be expedited if rooter is attached to dozer. Rooter is comparatively small and inexpensive unit and can be easily hooked on to tractor-dozer with 2-drum power unit. It does not tie up tractor power when not in use and frequently eliminates need for expensive, difficult-to-obtain drilling and blasting tools that may not be required full time on job. Dozer-rooter combination breaks up tough shale in this cut for faster dozing, and results in carryall scraper getting bigger loads more easily.

TREE REMOVAL

is frequently part of earthmoving jobs and can be handled by dozers ordinarily used for road building and other earthmoving work. Small dozer-tractors can easily and quickly clear out and pile brush and small trees. Large dozers, properly handled, can take out large trees. Those that are too big to be pushed over with single pass can be removed by building up ramp, as shown in photographs and sketch. First, earth should be dug out and roots cut on ramp side of tree. Then ramp can be built with excavated earth, and dozer blade placed high up on tree to get greatest leverage. Tree can then be pushed over, but tractor should be backed away immediately after push in order to avoid possible danger to driver or tractor from freed roots. Uprooted tree can then be pushed out by dropping blade of dozer under it as shown in sketch. On very large trees it is advisable to dig out earth and cut roots on right and left sides of tree as well as on ramp side. Stump or log placed under fall side of tree will pry all roots out of ground as tree falls.









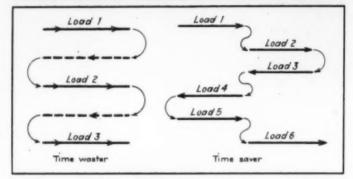






PUSHER-TRACTOR has just finished loading scraper hauled by Tournapull pulling out of pit in foreground and is ready to swing around and contact second unit loading in opposite direction. By this method pusher-tractor traveling time and distance are lessened and loading of scrapers is speeded up.

MORE WORK FROM Bulldozers ...Continued

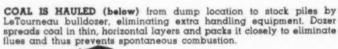


PUSHER-LOADING OF SCRAPERS with dozer was introduced because tractors had power to haul larger pay loads than they could excavate. Larger carryall loads and reduced loading time resulting from pusher loading justifies use of extra dozer tractor with fleet of scrapers. Time and money can be saved by planning pusher and scraper work to eliminate waiting time for either scrapers or dozers, and by steppushing and loading in both directions. Left-hand sketch shows conventional pusher-loading procedure. After each loading, pusher returns to same starting point. This return trip means lost time and greater pusher costs. Right-hand sketch shows step-push method by which both pusher travel and pusher time are saved. On many jobs this simple change in loading technique has enabled pusher to serve 4 instead of 3 scrapers.

SPECIAL USES FOR DOZERS



ORE HANDLING is facilitated by using dozer to fill in dead spaces on dock that would otherwise be inaccessible to ore bridge.







RAILROAD TRACES are moved easily and quickly on slag pile by special attachment developed by large industrial plant to be used on dozer. This device makes it possible to keep tracks always on outer edge of pile.

LOGS ARE LOADED (below) on truck faster, easier and cheaper with dozer. Logs are rolled up on two railroad rails placed either side of dozer and resting on log alongside truck.



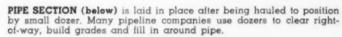


GRAVEL FOR ROADWAY was needed by logging company on job, so dozer was put to work getting it out of creek (above), and loading it on to trucks (below) by way of ramp built up of logs. One dozer loaded 106 3-yd. trucks each 8-hr. shift.





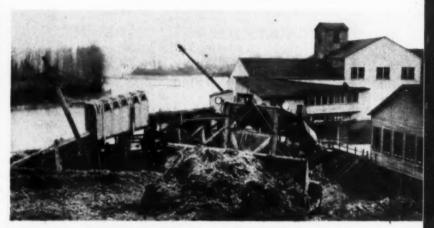
FIVE CONCRETE HOUSES were demolished in 3 hr. by dozer on construction job in Hawaii in connection with grading operations for 7-track railroad.



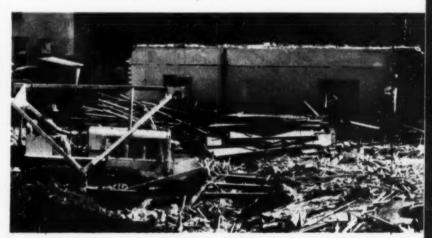




LAND IS CLEARED AND LEVELED ahead of dragline and dredge by dozer that also builds dikes, dams and roads for large dredging company. Before dozer was pressed into service, dredge operated only about half time on profitable work because dragline was being used to do many jobs that could be taken over by dozer.



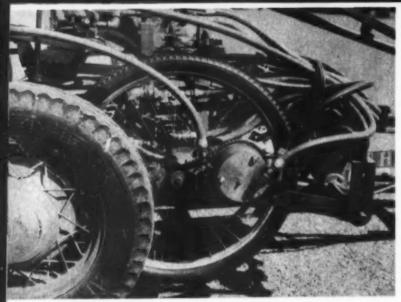
SAWDUST IS SPREAD AND PILED for paper company by dozer equipped with special side-boards. Prior to using this method, paper company reported, many fires occurred in piles.



HOUSE WRECKAGE is cleaned up by dozer, and ground leveled for new construction.

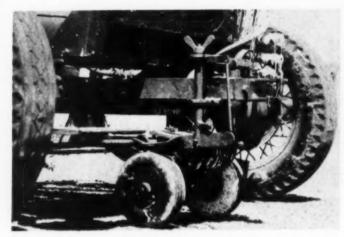
BRIDGE RAILINGS (below) had to be removed as preliminary to widening of reinforced concrete bridge. Dozer was put on job, after dynamite had been tried without success, and had railings down in 15 hr.





BICYCLE WHEEL operates attached cylindrical interrupted valve for applying paint to traffic lines.





BEAD-APPLICATION MECHANISM at rear of vehicle sprays coating automatically on painted sections of stripes.

BROKEN-LINE TRAFFIC STRIPES, sprayed with glass beads for greater visibility, are now being automatically painted on California highways, at a great saving, by means of an air-controlled attachment mounted on machinery that formerly painted only continuous stripes. The paint-spraying gun is synchronized with the glass bead dispenser by a rotary disk-type of air valve, driven by a variable ratio mechanism designed to compensate for different field conditions, and enabling the operator to maintain a regular cycle length of 40 ft. All the new, interrupted stripes are to be 15 ft. long, 3 in. wide (instead of 4 in. as previously) and separated by 25-ft. spaces. The saving of more than 60 percent effected by painting and bead-spraying only 15 ft. out of every 40 ft. is about \$112,000 annually.

The outer ring of the rotary valve in this new, economical device, designed by Donald H. Clark, Jr., for California's highway department, controls the compressed air supply to the paint spray gun actuating air ram, which in turn controls the needle valve that turns the spray on and off. The inner disk contains the valve controlling the air supply to the bead dispenser air lift, and is adjusted in relation to the outer disk to coordinate the glass bead application on the painted sections. As the dispenser is raised clear of the road by the air lift, it comes in contact with a brake that cuts the feeding of the beads auto-

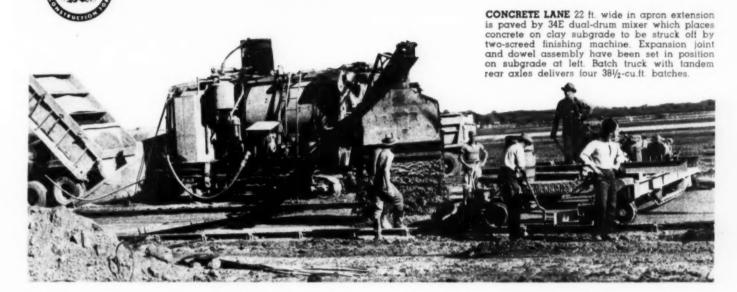
Photos California Division of Highways

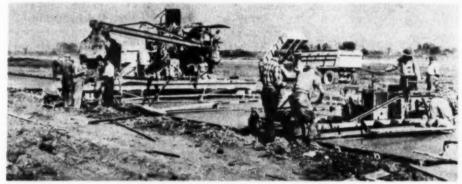
Photos

Three Dual-Drum Pavers

Lay 1,300,000 Sq. Yd. of Airfield Pavement in

105 Working Days



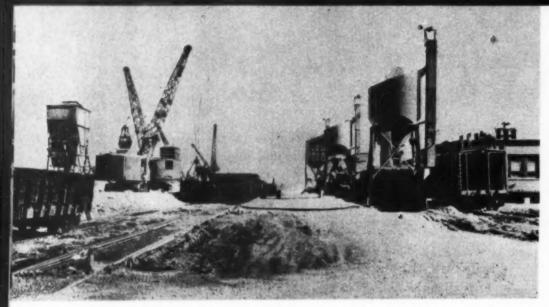


AFTER HAND FLOATING of surface, self-propelled joint machine installs longitudinal centerline and transverse contraction joints. Plow-handle longitudinal float beyond joint machine is operated by two men from bridges.

consistently fast progress by three 34E dual-drum pavers, resulting in completion of nearly 1,300,000 sq.yd. of concrete pavement in 105 working days, capped the speedy and well coordinated construction program by which a contractor group in less than four months transformed a small existing airport into 1,300-acre flying field for a Naval Reserve Aviation Base in the Middle West. Placing non-reinforced slab of various uniform thicknesses from 9 in. to 5 in. for runways, taxiways, aprons and landing mats on natural clay sub-



CONCRETE PAVEMENT for apron extension is placed in alternate 22-ft. lanes, followed by paving of intermediate lanes between completed slabs.



BATCHING PLANT served by three railroad tracks comprises three bulk cement bins, at right, and three aggregate bins, at left, to which six clamshell cranes feed sand and gravel out of cars when plant is supplying batches to three 34E dual-drum pavers.



LIQUID SEALING MEMBRANE is sprayed on finished surface to form impervious film under which concrete can cure without loss of moisture. Sealing compound contains fugitive dye which fades out within day after application, leaving colorless transparent membrane on concrete.



POCKET around steelrod mooring eye installed flush with surface in soft concrete of
apron is finished by
workman on kneeling
board with hand trowel
and brush, leaving
mooring eye exposed
to hold anchor rope of

to hold anchor rope of parked airplane. Mooring eyes are set at 20-ft. intervals, midway between transverse contraction joints.

grade in 22-ft. lanes accommodating standard width equipment, the three pavers made a steady average progress of 15,000 sq.yd. per day for all classes of pavement, while running up a total of 100 mi. of 22-ft. lane in the 105 days. Working days were made up of two shifts, 16 hr. in length, 7 days per week, but the paving mixers ordinarily operated only about 14 hr. out of a two-shift day.

Paving started with one 34E mixer on June 23. The two other pavers were brought in and put to work at the end of successive intervals of about 12 days each. Full production by the three machines, two Koehrings and one Rex, thus was available on the job from the second half of July until the major paving had been completed. The latter stage had been reached by Oct. 7, when the accompanying photographs were made.

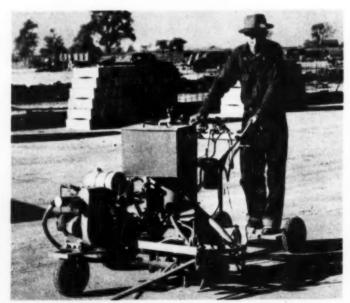
On this date, Oct. 7, just 107 calendar days after the first mixer started operation, all the main pavements with the exception of a few gaps had been placed, and there remained to be completed only about 50,000 sq.yd. of apron extension and 50,000 sq.yd. of storage area recently added to the original plan. With this relatively small amount of paving left to be done, one mixer already had been released for shipment to another project, and it was expected that a second mixer could be released in a short time.

As may be noted from the fact that the pavers worked 105 out of 107 calendar days, rain was not permitted to interrupt the progress of the work. Although many rainstorms oc-

(Continued on page 130)



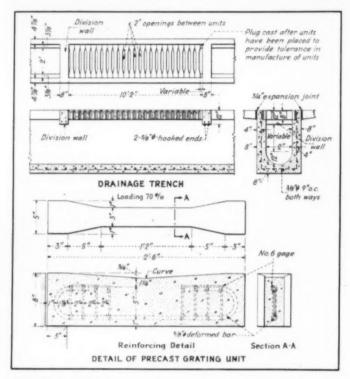
PORTABLE SPRAY OUTFIT built to carry barrel of sealing compound is equipped with gasoline-powered compressor which supplies pressure to feed liquid through hose line to spraying nozzle.



DUAL APPLICATION of both yellow paint and glass beads for light-reflecting numerals and runway stripes is accomplished in one pass of spray-painting machine. Two spray nozzles at rear end of projecting guide pointer apply yellow paint, and small spreader device behind spray nozzles puts down glass beads fed to it through tube.



SEMI-CYLINDRICAL PLYWOOD FORMS for rounded invert of drainage trench are used repeatedly. Reinforcing frames are at left, while precast grating bars for top of drainage trench stand stacked at right.



DRAINAGE TRENCH featuring open grating of precast bars installed flush with pavement surface is designed to trap runoff from large paved areas. In building trench, construction joint is used between invert and walls.



PRECAST GRATING BARS, shaped as shown by accompanying drawing to provide 2-in. opening between bars, are set on shoulders of trench walls. Premolded ribbon filler is used on shoulders where necessary to adjust grade.



LADDER-TYPE TRENCHING MACHINE makes cut in clay soil for drainage trench at edge of runway pavement intersecting paved landing mat. Machine travels on wooden pads to protect pavement. Clay sidewalls of trench stand without sloughing.



REINFORCING FRAMES for drainage trench are assembled upside down on wooden horses.



AFTER INVERT CONCRETE has been placed and vibrated, inner forms for walls and top cross-struts of drainage trench are installed. No outside wall forms are required in clay soil, which stands vertical. This drainage trench is to catch runoff at outer edge of landing mat.

Guy Derricks

Place Concrete for LogalHanna Dam



TALL GUY DERRICKS with 135-ft. masts and 120-ft. booms, spaced along axis of dam, handle placement of concrete in bottom-dump buckets. Wood forms are of cantilever type. Dam is built in monolithic blocks each 40 ft. wide. Central batching and concrete mixing plant is shown in lower left corner of photograph.

WITHIN COFFERDAM (below) of earth-filled double-wall type, excavation of foundation for dam is carried on with aid of guy derrick mounted on timber cribbing.



LOYALHANNA DAM, gravity type concrete structure 760 ft. long and about 130 ft. in maximum height above low point of foundation, was completed last year to function as one of five flood control structures planned by the Corps of Engineers, U.S. Army, for the protection of Pittsburgh, Pa. Four of the dams - Loyalhanna, Crooked Creek, Tionesta Creek, and Mahoning - are on tributaries of the Allegheny River, while the fifth, Youghiogheny Dam, is on a tributary of the Monongahela River. The reservoir formed by Loyalhanna Dam has a gross capacity of 95,500 acre-ft. and when full covers an area of 3,280 acres. The tributary drainage area above the structure is 291 sq.mi.

Under a contract amounting to \$1,371,710 (exclusive of cement and certain items of machinery and equipment) the dam was built by the Great Lakes Dredge & Dock Co., of



INCLINED BELT CONVEYOR 24 in. wide and 279 ft. long delivers coarse aggregate of 6-in. maximum size to batching and concrete mixing plant.

ROCK EXCAVATION (below) within cofferdam is removed at site of stilling basin below spillway with aid of clamshell bucket on crawler crane and tractor-bulldozer



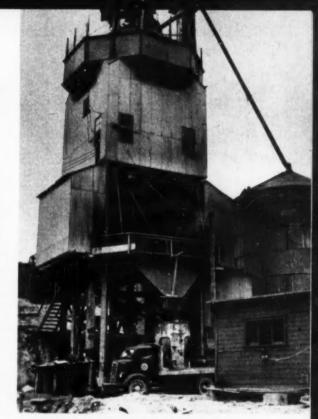
Chicago, using guy derricks for the placement of concrete in bottom-dump buckets. The dam consists of nineteen monoliths or concrete blocks each 40 ft. wide and of varying heights, depending upon the depth of the foundation, as indicated on the accompanying cross-section. The 760ft. length of the masonry section is extended for a couple of hundred feet on the left bank of the stream by an earth embankment covered on both upstream and downstream slopes with rock fill. The concrete spillway section is 190 ft. long with its crest at El. 948; movable crest gates, however, raise the controlled spillway level of the reservoir an additional 27 ft., or to El. 975. The spillway discharges into a concrete-lined stilling basin. Across the top of the structure a roadway is carried at El. 983.

The accompanying photographs indicate the general scheme of construction carried out by the contractor and illustrate certain details of method and equipment. Foundation

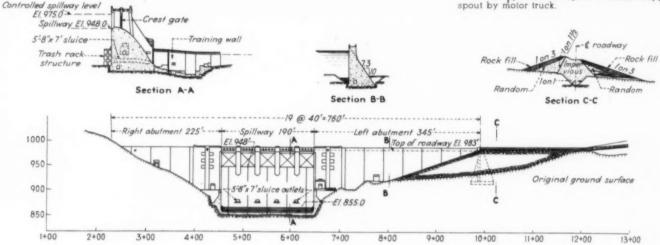
excavation and concreting for the section of the dam across the river channel were handled within earthfilled double-wall cofferdams of sheeting held in place with wales and tierods.

Concrete was mixed in a central plant at one end of the dam on the right bank of the stream. The installation included a Johnson aggregate batching plant fed by an inclined Barber-Greene belt conveyor, 24 in. wide and 279 ft. long. The batchers, using bulk cement from a 3,000-bbl. silo, delivered into two 2-cu.yd. Smith tilting mixers which, in turn, discharged their batches into 91-cu.ft. Blaw-Knox bottom-dump buckets carried by motor trucks to points within reach of four American guy derricks mounted along the axis of the dam. These derricks had 135-ft, steel masts and 120-ft. booms and were rated at a capacity of 15 tons. After the buckets had discharged their contents within the forms the concrete was

(Continued on page 137)



BATCHING AND MIXING PLANT using bulk cement from 3,000-bbl. silo is equipped with 2-cu.yd. tilting mixers which discharge into bottom-dump buckets spotted under hopper spout by motor truck.



GRAVITY TYPE DAM 760 ft. long is formed of nineteen 40-ft. wide monolithic blocks of concrete. Spillway 190 ft. long is equipped with crest gates to increase reservoir level 27 ft. Spillway terminates at lower end in concrete lined stilling basin.

CONCRETING STARTS (below) on base of dam within cofferdam which covers area of four monoliths, including half of spillway section.



CANTILEVER FORMS (below) of wood are being set for pouring concrete in new lift of block. Note safety walkways with guard rail to protect workers on forms.





WRONG: By sinking blade at angle, workman makes long, hard cut. He will have to push way down on other end of handle to break loose load.



RIGHT: With straight downstroke of blade, worker does not need to push as far into ground, and needs only to pull back on handle to break loose clod of earth.



WRONG: By taking too big a bite, workman is slowed up, Handling 8- to 10-in, chunks tires average shoveler quickly and reduces his total yardage.

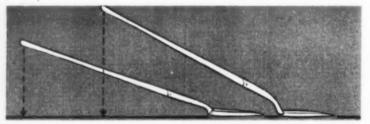


RIGHT: Best sized bite is from 4 to 6 in, for average workman. With this amount per shovelful, he will move more yardage of earth in 8 hr., and do it easier.

Use Shovels Right

To Step Up Digging Output

MORE MATERIAL can be moved, and work can be done faster with less effort, if an ordinary tool like a hand shovel is handled in the right way. The Union Fork & Hoe Co. of Columbus, Ohio, makers of center-reinforced Razor-Back shovels, offers the practical suggestions embodied in the accompanying notes and sketches to guide workmen in getting the most out of their shovels during digging and shoveling, with the least expenditure of energy.





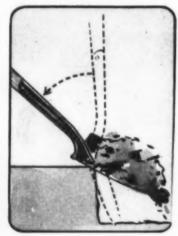
WRONG: To dig with high-lift shovel (left), workman has to hold handle way out in awkward position.

RIGHT: Low-lift shovel (right), with handle only 22 in. from ground when laid flat brings handle into correct position for easy digging.





WRONG: Lifting on blade of shovel to loosen and start raising load, workman soon tires and slows up.



RIGHT: By using edge of hard ground behind shovel for fulcrum, worker lets shovel do work. All he has to do is pull back and down on handle to pry loose and start lifting load.



WRONG: Workman's feet are too close together. Standing in this position he is unable to use legs effectively in lifting and throwing.



RIGHT: With feet separated, worker has good balance and spring in his knees. In this position, legs can take some of load off of arms and back.



WRONG: Left hand grips shovel too far up on socket, away from load. This grip gives poor leverage, and makes load feel heavy.



RIGHT: Left hand grips socket close to load, giving much better leverage and making load feel lighter.

EASIER TO THROW: Short handle with D-grip gives workman something to push on when throwing, and to pull back on after load is thrown. It is also easier to keep blade from turning



ON MATERIAL-MOVING JOBS short D-handled shovels are best.

handle makes lifting easier be-

cause workman bends back and



SCRAPING SHOVEL BLADE with piece of wood to remove adhering earth before storing protects finish,



LONG-HANDLED SHOVELS are naturally an advantage on trenching or other jobs where load must be thrown considerable height.



OIL OR WAX rubbed on shovel handle before storing preserves wood. For long lay-ups metal parts should be greased, too.



WRONG: Long curve of socket prevents gripping close up to load, and makes lifting and throwing harder.

RIGHT: Sharp curve of socket, close to blade makes gripping close to socket possible, and hence load is lifted and thrown with less effort.



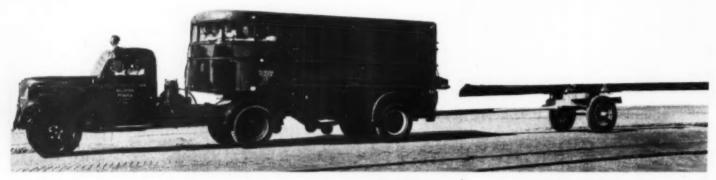
BLAST FUMES IN TUNNEL REDUCED BY

Air-Water Spray

AN AIR-WATER SPRAY for clearing tunnel headings of the dangerous carbon monoxide fumes that linger in the dust and smoke after each blast was developed on a recent N. Y. Board of Water Supply project, by George Underwood, tunnel superintendent, and Palmer Tubbs, safety superintendent, of the Walsh Construction Co. Numerous attempts to improve air conditions had been made on this 13½-ft. diameter hard rock bore for the Delaware River Aqueduct by adjusting the cycle between exhaust and blowing operations. The smoke cone and dust, however, remained in the headings despite persistent efforts to remove them quickly. When the spray was introduced, more smoke and dust were eliminated by it than by any other device tried in connection with underground blasting.

The apparatus, known as the Underwood spray, consists of a piece of 3-in. pipe about 3 ft. long, with a 1-in. standard iron pipe welded in near the head. About 1 ft. from its end the 3-in. pipe is heated and bent to a 30-deg. angle. This bent end is then heated and pressed flat, so that the opening is 4 in. in length and ¼ in. wide. About 6 in. back of the flattened end the 1-in. iron pipe is welded into the larger pipe, parallel to the 2-ft. unbent section. The other end of the 3-in. pipe is fitted with a swivel joint connection and attached to the main air line, which has a pressure of 100 psi., at a point 80 to 100 ft. back of the tunnel face. The water line that feeds the drills is attached to the 1-in. iron pipe, and supplies water under a pressure of 75 psi.

When the heading is loaded and ready for shooting, the blaster turns on the water, and then the air. The 30-deg, angle of the pipe end makes it easy to direct the heavy curtain of water across the entire tunnel, for about 5 to 10 min. at the rate of about 125 gpm. Blast gases and dust are blown into and through the water curtain, which continues to spray the remaining dust and fumes. Carbon monoxide and combustible gas tests made 5 min. after the blasting show that practically no gas, powder smoke or fumes remain in the tunnel.

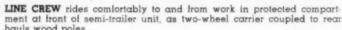


Truck-Trailer Units Speed Utility Construction and Maintenance

SEMI-TRAILER UNITS, compactly designed to carry materials, equipment and line crews for utility construction and maintenance, are attached to special Florida Power Corp. trucks fitted with adjustable pipe booms and power units for setting poles. A fleet of four of these 1½-ton built-to-specification Dodge units is in service in St. Petersburg.

Requests of power-line crews for a combination vehicle especially adapted to construction and maintenance operations were met by John Auer, superintendent of transportation for the Florida Power Corp., who drafted specifications for these all-purpose units. Small wheels under the trailer make it possible to detach the trailer from the Dodge truck body for maximum maneuverability in congested areas. Couplings at the rear make it easy to attach a two-wheel pole carrier.

The units were subjected to rigorous tests by Mr. Auer before they were put in service, and embody all the latest safety features. Mileage records show low operating costs,





POWER UNITS on built-to-specification $1\frac{1}{2}$ -ton trucks, with semi-trailers detached, are inspected by crew members, as JOHN AUER (standing on right side of truck at left), superintendent of transportation for Florida Power Corp., points out features of power unit for pole setting.



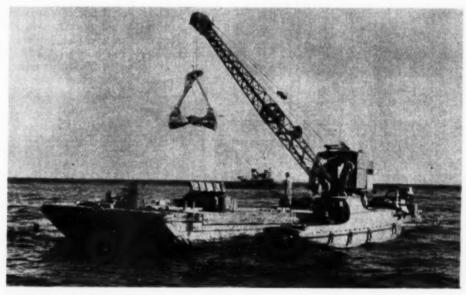
SEMI-TRAILER BODY, attached to rear of truck, is specially designed to provide ample space for tools, materials and equipment, both inside and outside, as well as transportation for crew in forward compartment.



POLE-SETTING BOOM (left) in rear end of truck is operated by power unit behind cab, as semi-trailer is detached for greater maneuverability.



SECTIONS OF WELDED STEEL PIPE being used for 24-in. oil line from Texas to fuel-starved Eastern Seaboard are wide enough to hold three smiling youngsters with inch or two to spare.



CLAMSHELL GOES TO SEA! Long associated with land activities like earth excavation and clearing for construction projects, this Marion crawler crane with clamshell bucket, mounted on seagoing scow, is in service on Canadian breakwater construction job in St. Lawrence River.



BRING UP THE ELEPHANTSI Traditional distress call of American circus roustabouts, when wagon train bogs down in move from one town to another, produces results in Far East. Under skillful direction of native boys, huge pachyderms help clear Ceylon jungle preliminary to construction of airfield.





JANUARY IN AUGUST is encountered in Alaska as year-round ice is uncovered on section of Alcan Highway. Where permanent layer of ice was found, it was not chopped away, but was left in place and covered with insulating mat of branches, over which earth fill was placed to carry roadway.



SYNTHETIC RUBBER begins to replace natural product in some articles as recently completed government-financed plants supply new product to manufacturers. G. L. Matthias of B. F. Goodrich Co., pioneer in synthetic rubber manufacture, examines diver's air hose of substitute material made in America.

Proper Care

IMPROVES JACK SERVICE

By F. J. JAKOUBEK

Chief Engineer
Templeton, Kenly & Co.
Chicago, III.

ANY JACK worthy of the name is tough. It looks rugged and it is rugged. But it is not invulnerable to abuse. Although few tools receive more frictional wear, implying the need for lubrication, jacks returned to the shop for repairs after years of service plainly show that they have never received a shot of oil or grease. A good grade of grease or oil, as indicated, should be applied to all bearing surfaces as often as needed. Proper lubrication reduces frictional losses and minimizes the effort required to operate the jacks under load.

Effects of Overloading

Even worse sins are committed in using jacks. Overloading is one. The mere fact that jacks of certain manufacturers are tested for a 50 percent overload doesn't mean that a 50-ton jack should be used to lift 75 tons. Overload capacity built into a jack is purely a safety factor, or margin for error, to guard against disastrous effect of possible mistakes made by the human users of the jacks.

Gross weight of a load should be conservatively estimated, and a sufficient number of jacks should be used, with the jacks properly distributed, to avoid overloading any jack beyond its rated capacity. Overloading imposes stresses which can spring racks and other parts, causing damage which results in eventual if not immediate failure. Such failures are hazardous. Whether the tool is an automatic lowering jack (or so-called lever jack), a screw jack or a hydraulic jack, the same precautions against overloading should be taken.

Keeping Jacks Clean

It is bad practice to allow the operating mechanism or rack bar of lever jacks to become fouled with dirt. Fouling, of course, sometimes is unavoidable, particularly in track jacks. The dirt should be blown out or, if necessary, the jack should be washed in kerosene. On trip or track jacks, where the operating mechanism is ex-



Fig. 1 . . . LEVER JACK cannot operate with full safety and effectiveness unless rack teeth and pawl seat are kept clean. Exposed operating mechanism of track jack is particularly likely to become fouled with dirt. Regular cleaning prevents fouling of operating elements.

posed, there is more chance for the entrance of dirt. The danger is much less with jacks of the non-tripping or automatic lowering type, which must be jacked down, as these jacks have cover plates over the operating mechanism. To obtain the best service from either type of lever jack, good practice demands that the user keep the socket pawl seat and the rack teeth



Fig. 2 . . . **SCREW JACK** can be maintained in dependable useful condition by regularly cleaning threads and lubricating them with machine oil. Safe limit marks point beyond which screw should never be extended.

clean to allow the pawls to engage fully (Fig. 1).

For the screw jack in all its various forms (such as the bell-bottom screw jack, locomotive screw jack, journal jack, standard speed jack, push-pull jack, shoring jack, machinist's jack, trench brace and mine roof jack), care should be taken to keep the screws clean and well lubricated. Continued exposure to grit and dirt causes abrasion of the screw, wearing the threads so that play develops be-



Fig. 3... PROTECTIVE SKIRT over screw jack in background keeps dust and grit off threads of operating mechanism. Washed cement bags are used for skirts on these jacks under portable rock crushing plant.

tween them and the corresponding collar threads (Fig. 2).

To keep dirt out of a pair of screw jacks which are used to take the load off the pneumatic tires on a portable rock crushing plant, a Rochester, Minn., contractor has ingeniously made skirts of washed cement bags (Fig. 3). Such a procedure is not always practical or even necessary, but screws should be cleaned occasionally,

(Continued on page 106)





"Now here is a model I think is really worth your investigation."



"Don't run over the engineer's grade stakes no more . . . he's got them mined!"



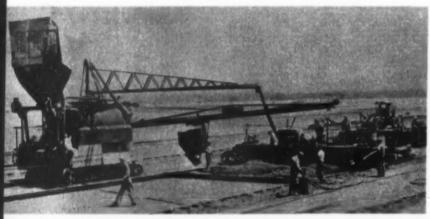
"See what I mean, Boss? Too damn much paper work!"



TO SPEED UP CONCRETE DELIVERY at Nor-fork Dam, gravity type structure 2,624 ft. long and 220 ft. high being built in Arkansas for U.S. Engineer Department, Morrison-Knudsen Co. and Utah Construction Co. have supple-mented service of their 2,835-ft. span twin

cableways to points beyond middle of dam by fleet of trucks carrying batches of concrete from mixing plant over roadway on completed portion of dam to point of discharge into special shuttle car equipped with hopper of 12-cu.yd. capacity. This car operates on section of

transverse track at loading dock formed at top of one of big monolithic concrete blocks forming body of dam and located near its midpoint. At this dock Koehring Dumptor trucks dump their loads of concrete into hopper car, which is then spotted to discharge into 5-cu. yd. bottom-dump buckets, which are picked up by cableway and lowered to place. By this arrangement cableway travel is reduced and 2½ min. lopped off time necessary for each trip in handling bucketful of concrete. Output of concrete has been stepped up 60 percent in half of dam farthest distant from central mixing plant. transverse track at loading dock formed at top

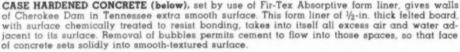


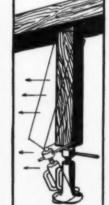
SWINGING CANTILEVER ARM rigged on Rex dual-drum paving mixer at airport project in California, carries hose line feeding water tank on machine clear of concrete pouring operations on slabs for 25-ft. lanes of runways.



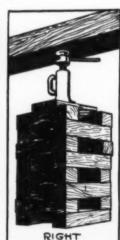
CONSTRUCTION DETAILS For Superintendents and Foremen

CASE HARDENED CONCRETE (below), set by use of Fir-Tex Absorptive form liner, gives walls of Cherokee Dam in Tennessee extra smooth surface. This form liner of $\frac{1}{2}$ -in. thick felted board, with surface chemically treated to resist bonding, takes into itself all excess air and water adjacent to its surface. Removal of bubbles permits cement to flow into those spaces, so that face of concrete sets solidly into smooth-textured surface.





WRONG



WHEN LIFTING ACTION OF JACK (below) must be extended, jack should be placed on top of extension, as shown at right below, and supported on firm base.



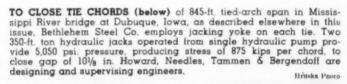


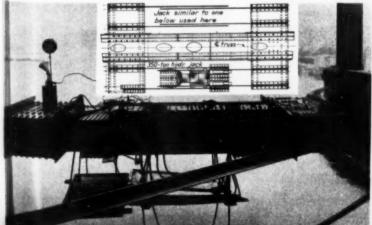
BULL-CLAM SHOVEL is name given new tractor attachment developed by Hi-Way Service Corporation of Milwaukee that performs as scraper, bulldozer and power shovel. Recently adopted by Army engineers for use in landfill operations at camp sites, this versatile mechanism digs, lifts, and transports cover materials without interfering with tractor operations.

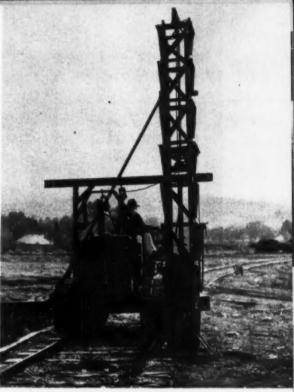




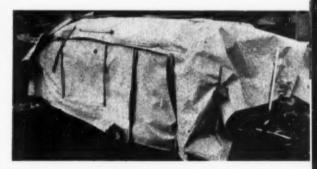
EXPANSION JOINTS in large retaining wall on Ohio access road are filled with natural volcanic clay from Wyoming. In photo at left, metal strip is placed over joint in preparation for filling and waterproofing. Right photo shows clay being placed in metal retainer on back side of expansion joint.







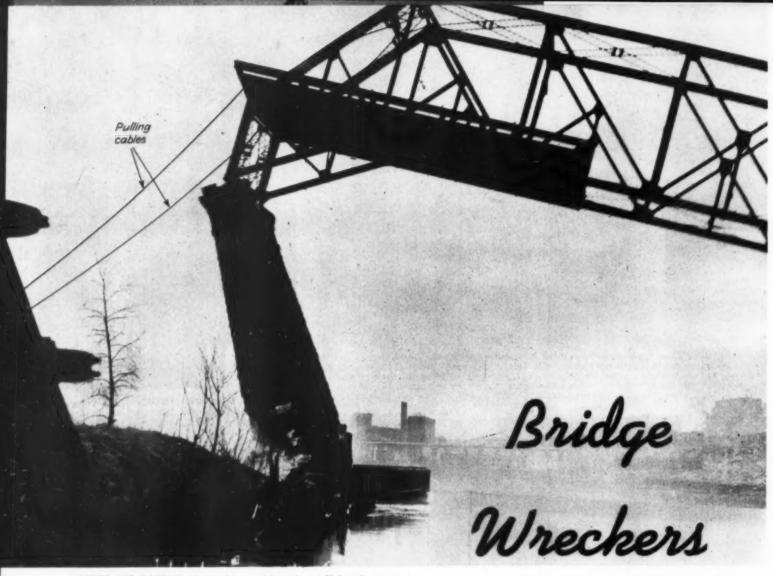
RAILROAD TRACTOR PILEDRIVER moving under its own power is fabricated from old equipment and scrap-pile material by Morrison-Knudsen Co., contractor, of Boise, Idaho, for purpose of stabilizing track of Union Pacific Railroad over soft ground by driving ties vertically between existing crossties of roadbed. Leads carrying hammer are mounted on tractor equipped with special track shoes to enable rig to ride rails and get on and off track quickly to avoid holding up regular train traffic. Device was designed and built by Murray Burns, Joe Wheeler and Irv Fordham of Morrison-Knudsen's railroad division.



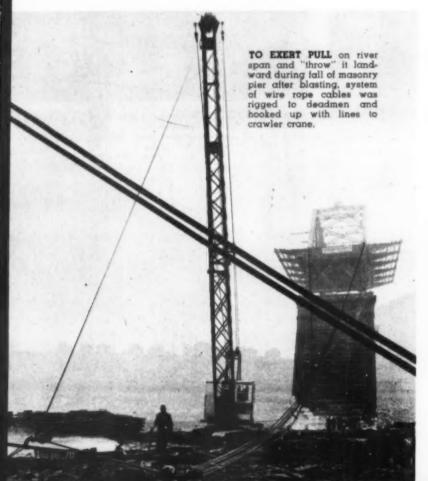
WEATHERPROOF PAPER serves as protective covering for piles of finished flooring and wallboard on housing project in Richmond, Calif., built by Robert McCarthy, San Francisco contractor, for Kaiser shipyard workers.

FORM YARD (below) of West Coast contractors building seagoing concrete barges is filled with piles of special small forms made up and stacked in this nearby work yard to be transported to dockside by straddle-type lumber carriers. Boxes in background are for inner-bottom forms, and fit between bulkheads and their stirrup reinforcement.





THERE SHE GOES! North pier base is blasted and 70-ft. tall masonry support topples, dragging river span landward in its descent.



Use Special Blasting and Rigging Technique to Drop River Span on Land



UNDERMINING OF NORTH PIER on land side to direct fall away from river is done by drilling rows of holes in masonry and loading with 224 lb. of dynamite, preparatory to blasting.

FOR SALVAGE AS SCRAP for war industries 4,500 tons of steel are being recovered by wrecking the 2,836-ft. long, 31-year-old Central Viaduct crossing the Cuyahoga River in Cleveland, Ohio, with a center span of 2311/2 ft. carried at a height of 103 ft. above water level by tall masonry piers. The feature of the scheme of demolition was the method employed for "throwing" the river span so that as much of its length as possible would fall on land, rather than in the water, thus simplifying the job of cutting up the structure for disposal and minimizing obstruction to river traffic. Under a contract with War Materials, Inc., of Pitts-burgh, Pa., the Cleveland Wrecking

Co. undertook the assignment of removing the structure and dropped the river span on Jan. 23 after rigging cables to pull the north end inshore and then drilling and blasting the base of the north river pier on its landward side. The demolition of the river span was handled under a subcontract with M. B. Baubach Co., of Norwood, Ohio.

In the entire viaduct there are 24 land spans ranging from 45 to 150 ft. in length, in addition to the $231\frac{1}{2}$ -ft. river span, which was of the leg-truss type. The viaduct was originally built of wrought iron in 1888 by the King Bridge Co. At the river crossing it had a swing bridge which, after an accident occurred, was replaced in 1912 with the present high level truss. The structure has been out of service for several years, as it was considered unsafe for traffic.

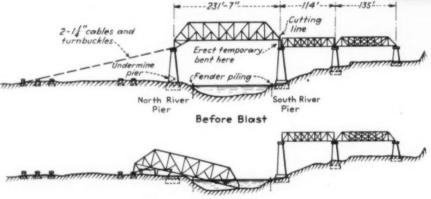
The general plan for wrecking the river span, which weighed 500 tons, is indicated in the accompanying sketch. First, the south end, which was to fall into the river, was lightened by removing cantilever girders and floor beams. Upon the south pier and in front of the (Continued on page 138)



METHODS OF "THROWING" BRIDGE during its fall land end of river span 40 ft. 6 in. inshore from base of blasted north masonry pier. Final operation involves cutting steel with torches and shipping for use as scrap by war industries.



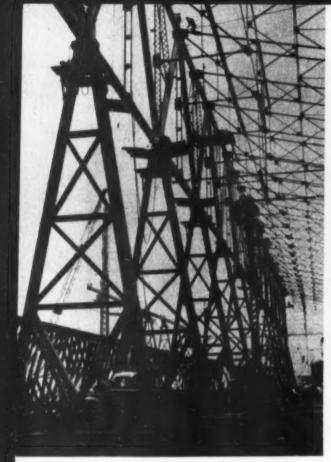
JUST BEFORE BLAST that will topple north pier (at right), river span has been stripped of floor members at south end and knee braces are in place over north pier to help drag structure landward when pier topples and pull is exerted by cables from hoisting drum of crane on ground.

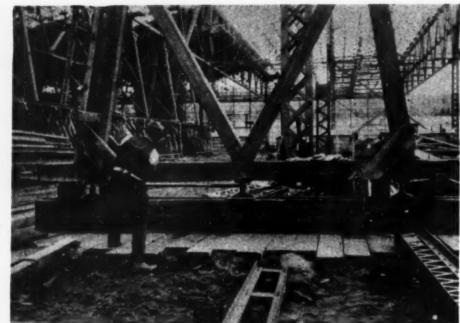


500-TON SPLASH (below) occurs as south end of span hits river. North masonry pier falls landward dragging trusses with it.

WRECKING PLAN for dropping river span involved drilling and blasting base of north masonry pier and rigging cables between end of span and deadmen for pull by crane to "throw" span partly on to river bank, instead of entirely into water. On south pier, posts with rounded bases are inserted to act as rocker arms for carrying end of falling span beyond pier and out into river.



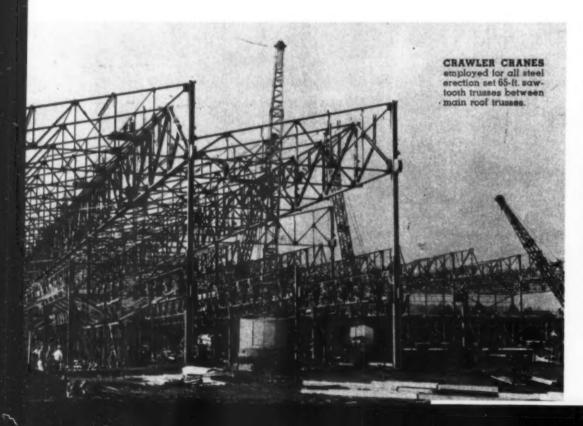




TIMBER A-FRAMES (left) on 44-ft. centers support 300-ft. steel roof truss while it is assembled and riveted in place. Screw jacks under A-frames facilitate camber adjustments in truss during erection.

THREE SCREW JACKS centered under legs and diagonals of A-frame permit vertical adjustment of steel truss resting on falsework. Blocking wedged under outer ends of A-frame bottom timber adds steadiness and auxiliary support. Plank mat and base timber under jacks are carefully leveled.

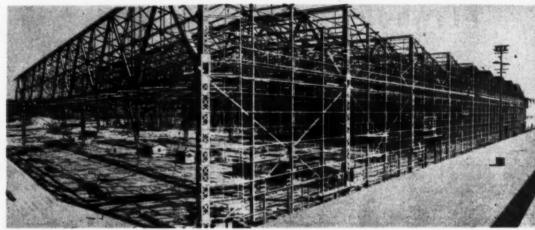
Timber A-Grames on Jacks Support 300-Ft. Steel Trusses



WITH THE AID OF TIMBER A-FRAME SUPPORTS, The Austin Co., contractor, rapidly erected 300-ft, steel roof truss spans in three parallel bays of a large building for an aircraft manufacturing plant. Because these long trusses are supported by columns on concrete footings carried by clusters of 32 piles, the design provided for the use of cantilevers with a 172-ft. span suspended in the central bay, instead of a continuous type truss, in order to produce a structure that would not be seriously affected by an uneven settlement of the foundations. A similar scheme of cantilevers and suspended center span also was employed in a portion of the building where the main truss spans are only 150 ft., as well as in the floor system of two-story portions of the building where, in alternate 50-ft. bays, a suspended beam 20 ft. long was hung by pin connections from the ends of the cantilevers.

Trusses for the 300-ft. spans were assembled in the air on A-frame supports placed under the bottom chord at the main panel points, 44 ft. apart. Each A-frame was set up on three screw jacks to permit accurate vertical adjustment, as required by the camber diagram for truss erection. This camber took into account the amount of settlement to be expected upon removal of the A-frames. The A-frames, 45 ft. high, were designed for 40-ton loading. Framing was carefully done to obtain a good fit for the plates and bolts at each joint,



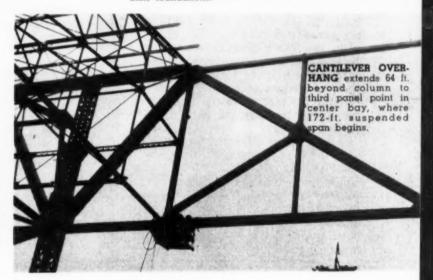


SPECIAL WRENCH (left) with 8-ft. pipe handle is used to turn screw jacks, which are set between 1-in-thick steel base plates and head plates. Latter plates have center depressions fitting rounded heads of jacks.

300-FT. TRUSS over side bay extends 64 ft. beyond interior column into center bay, at left, where 172-ft. suspended truss will be connected between 64-ft. cantilevers to complete 300-ft. span. This design is less sensitive than continuous truss to uneven settlement of column foundations.



JOB CONFERENCE takes place when RICHARD ELLIS (left), district manager, The Austin Co., catches up with H. H. BROWN, steel super-intendent, busy directing assembly of 300-ft. roof trusses on A-frames.



thus minimizing compaction in the A-frame itself under load. The jacks under the 10x18-in. bottom timber (laid on the flat) of each A-frame rested on a carefully prepared timber foundation accurately located by transit.

Steel bearing plates 1 in. thick were used against the timbers above the

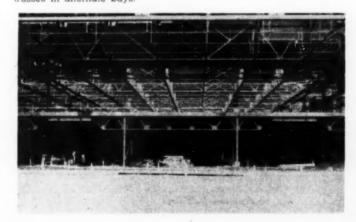
heads and under the bases of the screw jacks. The upper bearing plates had central depressions fitting the rounded heads of the jacks to keep the heads from working off center; these depressions were kept well greased. Base plates under the jacks rested on double 10x18-in. timbers set on edge and joined together with bolts and

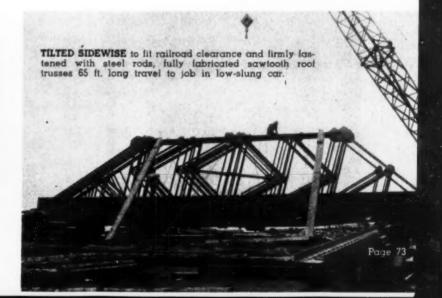
spacers. This timber sill was supported on a mat of 4-in. planks, as shown in a photograph. All parts of the A-frame foundation — supporting soil, the plank mat, and the double 10x18-in. sill — were carefully leveled.

Truss erection started with placing of the lower chord in sections up to

(Continued on page 104)

50-FT. FLOOR SPANS (below) in two-story portion of building include pin-connected beams 20 ft. long suspended between cantilevered trusses in alternate bays.





PLYWOOD HOUSE BUILT OF Factory-Made Panels

SKIN-STRESSED PLYWOOD PANELS of box-beam construction provide both complete inclosure and structural strength in a house recently developed by Kem Weber, Los Angeles designer, for production by three large door manufacturers in the Pacific Northwest. As shown by accompanying photographs of the first house, erected by the March Construction Co. in Tacoma, Wash., prefabricated panels with splined joints form the floor, walls, partitions and roof. The only framing member above the floor is a box girder to carry the gable roof, pitched slightly in two directions from the ridge. Efficient space planning and built-in fixtures make a livable dwelling of 24x30-ft. floor area which it is claimed can be built in quantity for \$2,200, exclusive of land cost. The factory-made panels are applicable to dormitories or commercial buildings, as well as to single and multiple dwellings.

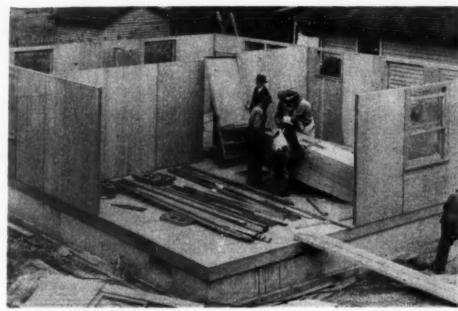
Prefabricated Panels

In the box-beam panels, plywood sheets are glued to both sides of the panel framing to make them part of the load-bearing structure. Exterior panels for walls and roof (as well as for the floor, if desired) are insulated during manufacture by insertion of blanket insulation between the plywood sheets. Light enough to be easily handled by two men, the panels are made in the following dimensions: floor sections, 4x8 ft.; wall units, 4x7 ft.; and roof panels, 4x12 ft.

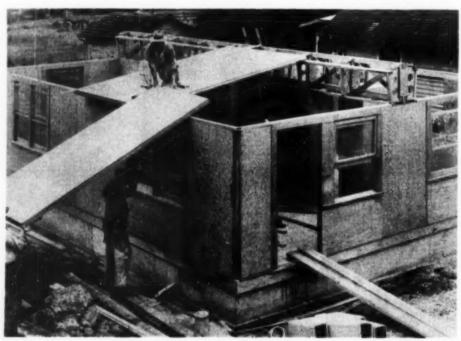
Exterior wall panels have ³/₈-in. waterproof plywood on the outside; the interior finish, used on both walls and partitions, is standard moisture-resistant plywood of ¹/₄-in. thickness. Floor panels have ¹/₂-in. plywood on top and ⁵/₆-in. on the bottom. Roof panels are made with ⁵/₆-in. plywood on top, as a base for the finish roofing, and ¹/₄-in. plywood underneath. A sealer coat is applied at the factory to protect the panels during erection.

Floor panels rest on foundation walls and interior stringers. Anchor plates for wall panels are set at the outer edges of the floor panels. The

edges of the floor panels.
(Continued on page 140)



GLUED PLYWOOD PANELS of box-beam type providing structural strength form floor, walls and roof of prelabricated house. Panels are joined by interlocking splines. Built-in fixtures come to job already attached to partition panels.



BOX GIRDER supporting roof panels provides raceway for wiring and duct for heating and ventilation. Wall panels are secured by anchor plates at base and wall plates at top.



PREFABRICATED HOUSE of 24x30-ft. floor plan is efficiently designed as a comfortable four-room dwelling which can be built in quantity for \$2,200, exclusive of land cost.

Present and Accounted For ... A PAGE OF PERSONALITIES



AWARD OF ARMY-NAVY "E" goes to P. T. Cox Construction Co. and Spearin Preston & Burrows, Inc., joint contractors, for outstanding work under difficult conditions on \$8.000,000 Navy project in Rhode Island, DONALD A. HUNTLEY (above), president of Cox organization, was in general charge of job.



CONSTRUCTION ENGINEERING PRIZE of American Society of Civil Engineers for year 1942 has been awarded to Rear Adm. Frederic R. Harris, consulting engineer, of New York, for his paper, "Evolution of Tremie-Placed Dry Docks." Admiral Harris was Chief of the Navy Department's Bureau of Yards and Docks during World War I and has since specialized in river and harbor works. At present his firm, in association with three others, is designing important graving docks and other installations for the Navy.



HANDED PRESIDENT'S GAVEL on Feb 3, JOHN S. MACDONALD takes over 1943 leadership of The Moles, New York organization of tunnel and heavy construction men. Mr. Macdonald has completed his tour of duty as project manager on twin-drydock job of Contractors for Dry Docks and now is vice-president and general manager for Walsh-Kaiser Co., Inc., building Liberty ships at Providence, R. I.



CONNECTICUT HIGHWAY PLANNING will continue under top direction of WILLIAM J. COX, state highway commissioner, reappointed for four years starting July 1, 1943. Mr. Cox last year was vindicated by public hearings of charges made against his conduct of office.



NEW STATE HIGHWAY ENGINEER heading California Division of Highways is G. T. McCOY, formerly assistant state highway engineer. Mr. McCoy was selected for enlarged responsibilities by Charles H. Purcell, recently promoted from state highway engineer to director of public works.



PHILADELPHIA CHAPTER of A.G.C., known as Master Carpenters and Builders Company, has elected as its new president HENRY C. TURNER, Ir. (left), vice-president of Turner Construction Co., who has been a director of chapter for three years.



NORTHERN CALIFORNIA CHAPTER of A.G.C., with headquarters in San Francisco, has named as its president for this year B. F. MODGLIN (right), of McDonald & Kahn, Inc., San Francisco.



Stop It Right Now!

Much sick-absenteeism can be blamed on colds and similar nuisance illnesses. Common colds spread through a group of workers rapidly, the infection virus or germs thriving on a common carrier such as a water bucket and dipper. Mouth-to-mouth contagion is the saboteur!

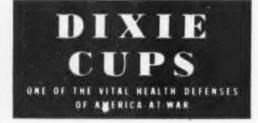
★ Here's a Way to Reduce Sick-Absenteeism

Hundreds of war plants and other front line production centers are protecting their workers with clean, safe Dixie Cups. Contagion is checked at the contamination point. The modern water boy takes a drink to the men at their work, in a cool Dixie Portable Water Carrier, each drink served in an individual paper cup. Once used, the Dixie Cup is discarded . . . a new, fresh one is ready for the next man. Time saved is substantial too . . . for the men do not have to leave their working location to go after water.

Prices . . . catalogs . . . complete information? Write for prompt action!

Dixie Cups and Contain-





CONSTRUCTION EQUIPMENT NEWS

Review of Construction Machinery and Materials

for MARCH, 1943

LIGHTWEIGHT PNEUMATIC DRILL identified as Size 00A and weighing less than 2 lb., is powered by Multi-Vane motor, has built-in speed regulator that can be set for desired performance and split-second throttle action which permits quick, accurate hole starting. Lubrication provided by built-in automatic



coiler. Lightweight and "fit-the-hand" pistol grip permits drill to be used long time without latigue, proving ideal tool for women operators. Chuck shield offers protection and also enables operator to guide drill more effectively by grasping shield with fingers of free hand. Tool is being widely used in war plants, particularly aircraft factories. — Ingersoll-Rand Co., 11 Broadway, New York City.



WIRE CUTTER WITH REMOTE CONTROL permits cutting or hot electrical wires at safe distance and enables workman to do work without danger from falling wires. Long-range cutter will handle either energized or cold lines. Slotted jaw with $1/y_2$ -in. opening holds wire by gravity until cut is made. Wire cannot escape as jaw closes at outside first. Handle is made of two 4-ft. sections of Douglas fir or spruce



which have been insulation-tested for 75,000 v. per ft. Cutting action is controlled by oper ating rope of insulation-tested spot cord. Cuting jaw is of high quality alloy tool steel 3/16 in. thick. Tensile strength is 295,000 lb. per sq. in. If jaw is burned when cutting live conductor, blade may be replaced within 30 sec.

American-La France-Foamite Corp., Elmira, N. Y.



STEEL PLATE RAMP developed to provide non-slip safety for men and machines consists of treads having perforated holes punched through tops of raised buttons, design based on fact that holes cannot "wear out" and that edges of holes won't be dulled as they wear down. Sharp edges of perforations also pro-



vide gripping action. Oil, water and other light liquids do not cling but drop through, making plates practically self-draining and removing cause of slipping accidents. Ramp may be supported in center or may be stiffened with turned-down edges to make self-supporting portable or stationary ramp or plate to bridge pits, holes, rough spots or obstructions. Uses: floor plates; stair treads which may be applied over old tread surface; catwalks, platforms and runways.—Morton Manufacturing Co., 5105 W. Lake St., Chicago.

* * *

MANIFOLD CARBON COPY PENCIL. designed to produce at one time five or six copies that are clear and legible, is made of black graphite and is soft enough to be legible on top sheet without cutting through original. With it, erasures are easily made and it is strong enough to withstand necessary pressure for copying work. Does not smudge from moist hands. Pencil is available in three degrees, medium, firm and hard.—Reliance Pencil Corp., Mt. Vernon, N. Y.



High detergent action and lubricating value of Gulf Dieselube H.D. insure minimum ring sticking, minimum engine deposits and maximum protection against wear.

Years of exhaustive research by Gulf technologists have produced an improved lubricating oil of the detergent type—Gulf Dieselube H.D. (heavy duty).

Gulf Dieselube H.D. meets U. S. Army specification 2-104A for use in automotive gasoline and Diesel engines and has been approved by manufactures of Diesel engines for tractors and trucks. This quality detergent oil is now used for lubrication of tanks produced by several leading builders.

Severe heavy-duty Diesel engine tests conducted by Gulf Research Laboratories show Dieselube H. D. keeps engines remarkably clean and gives maximum freedom from ring sticking.

This new oil is recommended for use in bus, truck, tractor, marine, and industrial Diesel installations, as well as for other Diesel engines where manufacturers recommend or operators desire a detergent type oil of the highest quality which is noncorrosive to alloy bearings.

Gulf Dieselube H.D. is also recommended for gasoline engines in commercial equipment where service encountered is extremely heavy and where ring sticking or lacquer formation has been encountered with previous oils.

For further information on Gulf Dieselube H.D., send the coupon below.



MAIL THIS COUPON TODAY



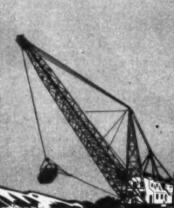
Gulf Oil Corporation . Gulf Refining Company	CM
3800 Gulf Building, Pittsburgh, Pa.	
Please send me, without obligation, further information Dieselube H.D.	tion about Gull
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GULF OIL CORPORATION · GULF REFINING COMPANY · PITTSBURGH, PA.

TODAY'S EMERGENCY DEMANDS THAT YOU

Get the MOST Out of Your Present Equipment!

Your PAGE Bucket can stand the gaff day after day without asking favors . . . but to keep your Dragline machine operating at top efficiency, take care of your bucket! Any operator who follows the simple maintenance and operation suggestions below will get trouble-free performance—which in a PAGE Bucket, means superior performance!



GOOD MAINTENANCE IS ESSENTIAL TO PRODUCTION

- 1. CHAINS. Chain life is shortened by uneven wear. Turn them over periodically.
- 2. TEETH. Sharp teeth are vital to fast digging. Renew points frequently.
- 3. CONTROL. Help your operator pre-

vent damage to bucket from uncontrolled dropping and jerking by keeping machine in adjustment.

 "PICK-UP." Dragging the bucket after loading wastes time and causes excessive wear.

Boost Production ... Keep america Strong



PAGE ENGINEERING COMPANY . CHICAGO, ILLINOIS

TWO RUST-PROOF PAINTS closely simulating aluminum are now available for indoor and outdoor use. Silver gray (No. 18328) is manufactured strictly for outdoor and some indoor uses on metal, concrete, brick and wood. It gives a high gloss finish and dries in from 6 to 8 hr. Claimed to be excellent for use in maintenance and new construction work in light industrial, residential and agricultural districts where only minor fume conditions exist on sash, buildings, tanks, fences, bridges, structural steel and guard rails. Fume-proof silver gray (No. 906) is for use in heavy industrial districts where smoke, brine, dampness or fume conditions are severe. On structural steel tanks, fences, machinery, hydrants, signs, guard rails, bridges and steampipes this paint is said to provide satisfactory protection plus aluminum-like appearance. Withstands temperature of 45 deg. F., and all weather conditions. In order to insure correct application of these coatings, company provides consulting service for analysis of special rust prevention problems.—Rust-Oleum Paint Corp.. Evanston, Ill.

* * *

TRAFFIC MARKERS made of inexpensive plastic because of their armor-like resistance to wear and unusual flexibility have been named "Armor-Flex". They are rectangular in shape and come in two sizes, 3x6x½ in. and 6x6x½ in., former being most popular. For special jobs 3/16 in. thickness is supplied. Colors are white, yellow, red and black. Traffic quickly polishes markers producing high light reflec-



tion. Non-absorbent and free from discoloration. Asphalt seal coats may be applied over paving and markers will shortly re-appear with full visibility. Applied to surface of paving with special hot mastic asphalt. For pavement messages, all letters, numerals and symbols are available in various sizes. Equipment for laying markers requires little skill, an average crew placing 2,000 markers per day. Manufacturer supplies all materials and equipment and carefully trains laying crews.—Armor-Flex Co., 4930 Fountain Ave., St. Louis, Mo.

* * *

GUMMED LABELS that stick to metal are being produced for use on tools, products and machines. Special gumming may be applied either to paper or linen fabric upon which any message may be printed or written. Stickers may be used to carry inspection data, instructions or warnings, and plain gummed labels are used mostly in office procedure for routing, scheduling and tabing—Ever Ready Label Corp., 141 E. 25th St., New York City.

The Forest Fights on Many Fronts Designed and Prelabricated by McKeown Brothers Co., Chicago And on the home front, wood has taken over metal's peacetime tasks in thousands of heavy timber structures. This 111-foot-span municipal pier in Chicago. is a typical example of how the TECO-RING Connector System has made it The TECO Ring Connector possible to employ timber as a heavy spreads the load on a timber joint over practically engineering material ... and to meet the entire cross-section of fully all requirements of speed, the wood . . . brings the full structural strength of strength and economy. Write lumber into play. for our literature today.

ENGINEERING COMPANY

WASHINGTON, D. C.

PORTLAND, OREGON

Bucket teeth Veterans

NOW FULL OF YOUTH!



GOOD AS NEW! That's what you'd say about these worn drag line bucket teeth after they had been salvaged with Coast Metals Hard-Facing! In fact, they are now better than new. Because Coast Metals Hard-Facing makes them extra-resistant to abrasion and wear, they will outlast and outwear ordinary teeth several times.

A trial will convince you that Coast Metals Hard-Facing can't be equalled for keeping equipment constantly on the job without unnecessary time out for repairs or replacements. Application is simple-either by the electric welding arc or the oxy-acetylene torch—to new or worn shovel and bucket teeth, lips and other parts of excavating and earth-handling equipment of any ferrous metal, including manganese steel, alloy steel, cast iron and chilled iron.

Tell us your wear-resistance problem. Coast Metals Hard-Facing can help you make your equipment last longer.

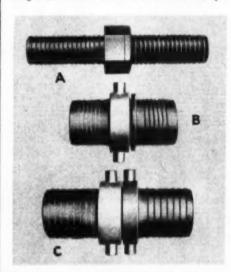
COAST METALS, INC.

Plant and General Offices: Canton, Ohio
Executive Offices: New York, N.Y.

COAST METALS
hard-facing
weld rods



ALL-MALLEABLE IRON SHANK COUPLINGS for suction and water hose are now available in all styles and sizes, either in black or treated to coating of synthetic enamel, to replace those formerly made of brass or part brass, now on the priorities list. Type A, in sizes up to 2 in., known as long-shank coupling, has corrugated shank of ample length to accommodate two or more clamps.



Female has hex swivel nut; male end has narrower hex portion. Ends are carefully rounded to prevent damage to tube of hose. Shank couplings (regular pattern B-1½ to 3 in., and heavy pattern C-3 to 6 in.-have deep, clean corrugations. Sturdy pin-lug swivel nuts are sufficiently recessed to hold washer in place when hose is disconnected. Rounded ends. Common shank coupling (not illustrated) for water hose in sizes up to 1½ in. has swivel nut on female section only. Deep, smooth-finished corrugations provide excellent gripping surface under clamp pressure.—Dixon Valve & Coupling Co., Hancock St. & Columbus Ave., Philadelphia, Pa.

ADJUSTABLE SCREED CAP of malleable iron is claimed by its makers to save time and to conserve critical materials. Cap may be set on 2x2-in. wooden stakes to fit conditions—short ones for hard ground and long ones

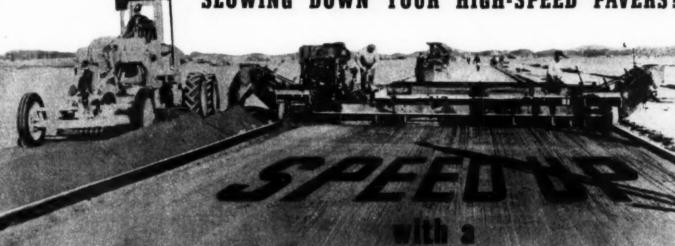




for fills of various depths. Wooden stake is driven first and then cast, malleable iron cap is quickly slipped on and adjusted to proper level. Either 2½-in, pipe or a 2x4 will fit in screed caps. Metal cap is not likely to be broken up by driving, since wood stake is first driven in, then cap is set on and adjusted to proper level. For decking, wood stake is cut to proper length and fastened to deck. — Whiteman Manufacturing Co., 3249 Casitas Ave., Los Angeles, Calif.

ARE OUT-of-DATE FINEGRADING METHODS

SLOWING DOWN YOUR HIGH-SPEED PAVERS?



Buckeyer R-B POWER FINEGRADER!

TODAY'S rush jobs call for speed from start to finish. Concrete and black-top pavers have been stepped up to record-breaking performances, yet on many jobs paving output is still keyed to out-of-date finegrading methods that waste time, paving material and money.

Power finegrading with job-tested Buckeyes delivers an accurate, smooth grade at rates to keep pace with your fastest paver. Slow hand operations are eliminated; there are no variations in grade to waste costly paving material... the job's done right and done fast!

THE BUCKEYE TRACTION DITCHER CO. FINDLAY . OHIO

No other existing equipment can prepare subgrade as quickly, cheaply and accurately as a BUCKEYE R-B POWER

FINEGRADER

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INVEST IN VICTORY ... BUY WAR BONDS AND STAMPS

Our President, as well as numerous Washington Officials and Executives, has publicly recognized the vital need for keeping motor trucks on the job. To this end, Service Men have been recently classified as essential war workers. Everyone in the General Motors Truck organization . . . Dealers, Service Managers, Parts Men, Mechanics . . . is

responding to this responsibility with all the resources at his command. These men have at their disposal years of experience with Preventive Maintenance service, special truck knowledge and training and specialized truck equipment. You can do your part by giving your trucks the best service. Thus, they'll serve America better!

Special "Service Payment Plan" available through our own YMAC

THE TRUCK OF VALUE

HEAVY-DUTY ANGLE DRILLING HEADS. junior size, designed for production drilling junior size, designed for production drilling and countersinking in close quarters, are used on flexible shaft or flexible shaft extension of portable electric drill. Available with 90-, 45-, 30-deg, or universal heads and have overall diameters of ½ or ¾ in. Widely used in aircraft production.—Wyzenbeck & Staff. Inc., 838-842 W. Hubbard St., Chicago.

FOR WEIGHING OF EQUIPMENT AND OTHER BULKY OBJECTS in general, and particularly before shipment by truck in order to meet rebefore shipment by truck in order to meet requirements of Office of Defense Transportation for maintenance of weekly log of loads hauled, new model of compact dynamometer, measuring 81/4x61/4x3 in. and weighing only 8 lb. 4 oz., has been developed for attachment to fall line of truck-crane, overhead shop crane or chain hoist, as illustrated, to serve as light, portable scale of large capacity. Pro-



duced in sizes for handling loads from 500 to 15,000 lb. Black dial with easy-to-read etched silver numerals is protected by ¼-in. shatter-proof safety glass crystal and is sealed from that said dist backet. proof safety glass crystal and is sealed from dust and dirt by rubber gasket. Has two colored indicator hands: Maximum indicator hand (red) remains at peak load for checkback and main indicator hand (white) resets itself instantly when load is released. Instrument constructed of special tool steel cannot be injured by overload. Applicable to a wide range of tension measuring uses with wire, cable or rope.

The company also makes a small portable table model of its dynamometer, in capacities up to 10,000 lb., for precision tensile testing of woods, metals and other materials. Calibrated to accuracy of 2 percent.—W. C. Dillon & Co., 5410 West Harrison St., Chicago, Ill.

Why <u>PRE</u>forming Conserves Steel, Makes Wire Rope Last Longer

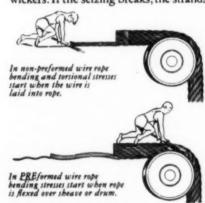
(Note: More and more wire rope users change to <u>PRE</u>formed rope each year. During peacetime the reasons for changing from ordinary to <u>PRE</u>formed wire rope were primarily two: the cost is lower; <u>PRE</u>formed is easier to handle.

Today, with our nation at war and with steel at a premium, there is another and most important reason for using PRE-formed. It lasts much longer under high speed, severe bending and continuous operation. PRE forming thus conserves steel. It conserves workmen's time; rope changes are less frequent. It reduces the accident potential; there is no wickering to harm hands or damage sheaves.)

There are two kinds of wire rope. One is called Regular, or ordinary, wire rope. The other is known as <u>PRE</u>formed.

In ordinary rope wires are held together under tension. The wires are laid into the rope by bending them to the desired shape. Bending and torsional stresses thus remain in the rope... are kept under control by seizing the ends of the rope.

If the wire breaks, it immediately wickers. If the seizing breaks, the strands



and rope wire both wicker. This causes damage and delay. In <u>PRE</u> formed wire rope, the strands and wires are preshaped to the exact curvature they will

take in the finished rope. Bending and torsional stresses are eliminated (except of course when the rope bends over a sheave). If a wire breaks, it does not wicker but remains relaxed, thus causing no delay or damage.

Advantages of PREforming

<u>PRE</u>formed wire ropes are like shoes that have been broken in. Instead of being stiff and unwieldy, they are flexible, easier to handle.



They are better adapted to bending and spooling, also. They resist kinking



when the rope is not under load.

PREformed wire ropes are easier to handle also because broken wires lay flar.



And finally, most important, <u>PRE</u>formed wire ropes have greater resistance to bending and fatigue. This is



another way of saying that they last much longer, do a better job when the pressure is on, as it is today in war production. When next you need wire rope, consider seriously the purchase of <u>PRE</u>formed wire rope. Today the job we must all do is the "best" job possible. When it comes to wire rope there is no question as to which does the "best" job. It's <u>PRE</u>formed.

Consult with Macwhyte

Don't overlook the help that Macwhyte engineers will gladly give you on any wire rope problem. Their advice gained from many years' work on all kinds of jobs is yours for the asking. Let us know the kind of work to be done; we will tell you the rope best suited for the job.

And this we urge you to do: take extra care of your present ropes. Inspect them regularly; lubricate them often. By so doing you can make them last longer and thus aid the war effort. That's what you want; that's what your country asks of you.

This is Number 13 in a series of informative articles prepared by the Macwhyte Company to help wire rope users obtain better and longer service from ropes on the job. All articles in this series are available on request.



MONARCH Whyte Strand PRE-FORMED WIRE ROPE

... Macwhyte premier wire rope, famous for its strength, toughness, and internal lubrication.

MACWHYTE COMPANY

WIRE ROPE

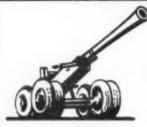
2940 FOURTEENTH AVE KENOSHA, WISCONSIN

Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope

MACWHYTE Special Traction Elevator Cable

MACWHYTE Braided Wire Rope Slings

MACWHYTE Aircraft Cables and Tie-Rods



NO! WE DON'T MAKE CANNONS

BUT we do make CONCRETE VIBRATORS and PORTABLE POWER PLANTS to vibrate the concrete for BIG GUN mountings—AND that's not all—PROMPT DELIVERIES can be made on the RIGHT PRIORITIES.

There is a JACKSON VIBRATOR for every concrete placement job—SO—if you have concrete to vibrate see us—we'll (1) send literature, (2) quote prices and (3) quote deliveries if you wish.

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ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON MICHIGAN





GRACO CONVOY LUBERS

THE WHEELS OF VICTORY

The right grease in the right place at the right time is helping to keep both military and construction equipment working harder, longer hours. Graco Convoy Lubers are servicing both military and construction equipment all over the world. Mounted on trucks. Convoy Lubers are able to follow rapidly moving military equipment, or keep up with the bulldozers and scrapers on the job.

Graco Convoy Lubers come equipped with heavy duty pumps which dispense track, gear, chassis, and hypoid lubricants at high speed through 30-ft. reel mounted hoses. A convenient 50-ft. air line services all size tires and can also be used for operating small pneumatic tools.

Increased production of Graco Convoy Lubers has made short time deliveries possible. A letter or wire will bring detailed information about these extremely useful field lubrication units. Ask for catalog No. 129.

GRAY COMPANY, INC.



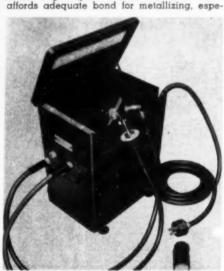


WOOD LOCKERS AND WOOD SHELVING. designed to avoid use of critical materials needed for war effort, are made in a variety of styles and sizes without use of any metal hardware. Lockers, of Masonite Presdwood, are available in two standard sizes: 12x18x72 in and 15x18x72 in. They are securely framed and assembled with waterproof glue and are finished in olive-green enamel. The shelving units are available in oak, poplar or pine with 1/4-in. gum plywood backs, adjustable within a wide range of spacing for shelf levels and dividing partitions. — Ivel Corp. 211 West 61st St., New York, N. Y.



OIL RESIN EMULSION PAINT called Opaltone, said to be washable, to cover most surfaces with one coat, and to be without objectionable paint odor, is recommended particularly for use in hospitals, hotels, clubrooms and homes. Applied by roller, brush or spray. Contains no critical raw materials. User doesn't need to buy accessories for painting, such as linseed oil or turpentine. Two gallons of Opaltone mixed with water make 3 gal. of paint ready for application. Requires no primer or sealer. Applied over painted surface as readily as over porous surfaces such as wallboard, concrete block, brick or plaster. Wallpaper may be covered with Opaltone.—Truscon Laboratories, Caniff & G.T.R.R., Detroit, Mich.

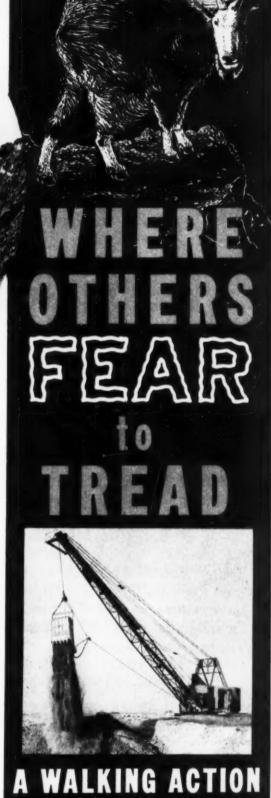
TO PREPARE BASE METAL for metal spraying, new Fuse-Bond process utilizes special electric welding equipment and technique to make rough deposit of electrode metal which



cially on hardest surfaces which are difficult to prepare by rough threading or grit blasting. Fuse-Bond welding unit contained in caster-mounted cabinet 2 ft. high, weighing 170 lb. complete, operates on 110- or 220-v. single-phase power. Holder uses up to six electrodes, depending on size and shape of part to be prepared. It is claimed that process may be employed to prepare small as well as large parts, because no excessive heating of base metal is involved.—Metallizing Engineering Co., 21-07 41st Ave., Long Island City, N.Y.



BUCYRUS-MONIGHANS walk surely . . . over rough ground or soft. They side-step obstacles, waste no time getting from one digging position to the next. They can work close to the edge of the bank, with consequent increase in effective range. They walk "softly," cushioning down with an ease that means long life. Because of the exclusive "Rolling Cam," they walk efficiently throughout millions of yards of tough digging. Performance has proved them the type of dragline that can handle the high pressure production so essential in wartime. They are available with booms up to 250 feet and buckets up to 20 yards.



BUCYRUS Monighan SOLD BY

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that lasts!

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Today you need every available tool to help your men keep rolling without a hitch. Make sure that you have plenty of Duff-Norton Jacks—for they provide "mechanical muscles" to speed your construction jobs. These sturdy, dependable, easy-to-operate Jacks are made for every type of lifting, lowering, pushing and pulling. Make full use of them.

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A handy 56-page illustrated data book on Duff-Norten Jacks. Gives sizes, prices, capacities. You need a copy.



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For hanging-up on
the job wherever
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Gives your men
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THE DUFF-NORTON MANUFACTURING COMPANY PITTSBURGH, PA.

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TOOL BITS for machining hard, tough steels and recently available copper or aluminum alloys are made of metal known as "Hardsteel," said to assure greater shock resistance minimizing breakage and higher heat resistance, permitting higher cutting speeds and deeper cuts. Satisfaction also is reported



when used on abrasive copper, brass, bronze and aluminum alloys, either rolled or cast. Claimed to be especially suited to work on heavy forgings where deep rough cuts can be made at faster cutting speeds. Other advantages: (1) may be reground on ordinary wheel time after time; (2) operating efficiently at red heat, they need less frequent regrinding. Made square and round from 1/8 in. up in all usual sizes.—Black Drill Co., 5005 Euclid Ave., Cleveland, Ohio.

TRANSFORMER TYPE AC WELDING MA-CHINE, said to combine exceptional safety with operating efficiency, has low open circuit voltage of 42 v., automatically and positively maintained by two primary coils with magnetic contactor in circuit of one primary. Each primary contributes approximately 42 v. to total open circuit voltage which is actually 84 to 85 v. When machine is idle, one primary is automatically cut out, restricting open circuit value to 42 v. As soon as electrode contacts work, second primary is thrown into circuit and if there were not a dead short, voltage would be 84-85 v. When operator draws are are comprehensive to tential of 84-85 v.



enables him to establish his arc quickly and begin welding. Most welding operations performed at between 32 to 40 v. When welding is completed and operator pulls out or lengthens his arc, voltage rises. When it reaches 45 v., contactor opens and cuts out one primary leaving 42 v. in open circuit. Other improvements: (1) Power factor correction is provided with built-in capacitors on all four sizes—300, 750 and 1,000 amp., resulting in power factor of 100 to 86 percent (lagging) over popular working range; (2) new wiring arrangement cuts out capacitors when machine is idle, thereby conserving power and reducing costs; (3) machine is portable and streamlined and its 18-in. widtipermits easy passage through narrow doors.

(4) dual-voltage connections for either 220 c-440 v. and thermal overload protection previded by cutout coil buried in winding; (5 single hand wheel control gives infinite number of current adjustments throughout NEMA. Frange.—Wilson Welder and Metals Co., Inc., 60 E. 42nd St., New York City.



Helps keep highways SMOOTH!

PUBLIC SAFETY demands roads and streets be kept clear of ice particularly at intersections. This constant "de-icing" is rough on concrete, often results in serious surface scaling.

Experience, however, shows that highways paved with Vinsol-treated cement may be expected to remain smooth, free from scaling, in spite of freezing, thawing, and the constant action of de-icing agents.

Proved Over Last 5 Years

The effectiveness of this development has been thoroughly proved over the last 5 years. For example, in a series of tests reported in one of the northern states, 61 alternate cycles of freezing, followed by thawing with ice-removing chemicals were obtained over a two-year period. In spite of these severe conditions, the Vinsol-treated cement remained practically scale-free, whereas the surface treated with normal cement showed extensive pitting.

VINSOL*-TREATED

CEMENT

RESISTS SCALING

In other sections of the snow and ice country, strips of Vinsol-treated cement were laid alongside of normal portland cement. Here again the Vinsol-treated cement showed practically no scaling, whereas the other surface was found to scale right up to the separation joints.

More Economical to Use

In addition to retaining its smooth surface, Vinsol-treated cement saves time and money in laying. It is plastic; there is less segregation of the aggregate, less bleeding and formation of mortar pockets. The result is easier spreading, faster finishing.

Easy to Obtain

You can probably obtain Vinsol-treated cement with full instructions for its use from your regular supplier. We have published a 44-page booklet, "Better Roads Ahead." Compiled from the experiences of practical engineering and construction men, it will be of value to you whatever type of job you're concerned with. Mail the coupon below for your copy.

*Reg. U. S. Pat. Off.

Specify Vinsol-treated Cement for Longer Surface Life

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A		INCORPORATED
7	HERCULE	S POWDER COMPANY

Bridge Constructors Depend Upon



LOWELL Reversible Ratchet WRENCHES

For running up nuts on anchor bolts and connections, bridgemen need wrenches that will work fast and SAFELY.

The LOWELL "Steel Socket" Bridge Builders' Wrenches—with their positive guarantee that handles will not break—meet the tough requirements of big bridge jobs.

Built in a wide range of types and sizes to cover many needs of the engineering-construction field,

Have patience with your dealer if he is unable to furnish all of the numerous LOWELL types and sizes, because we are engaged, for the duration in supplying the needs of our Armed Forces.



See how each paul, when engaged, transmits beweape from the solid stock of the handle, direct so the gear, in a straight line and with a square contact. The paul is in compression only—no thear, no tension, no tersion. The shipper carries none of the load. This strong construction

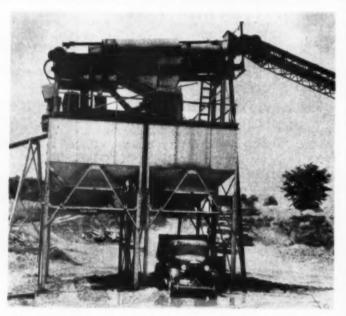
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PRODUCE IT FASTER WITH BUTLER BINS

In any aggregate plant, whether for crushing, washing, or screening, it is engineered design that makes the difference. And that

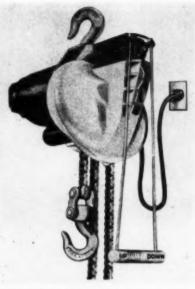
is what you are offered with Butler bins. More than twenty years' experience in designing and laying out plants of this kind have equipped Butler engineers with the ingenuity and experience to design your plant



In these days especially, no one can afford to be too little or too late. Assure yourself of maximum production and efficiency by getting in touch with your Butler engineer today.

BUTLER COMPANY

WAUKESHA



PORTABLE ELECTRIC HOIST, known as "Midget King," may be had in ac. and dc. models and in 1/8-, 1/4-, 1/2- and 1-ton capacities. Features: (1) Low operating cost—2c per day; (2) requires no extra equipment—a place to hang and an electric outlet; (3) speed, economical and efficient operation said to cut minutes from all handling jobs in which they are used.—Yale & Towne Mig. Co., Philadelphia Division. 1421 Chestnut St., Philadelphia, Pa.

FIBER CONDUIT, known as Bermico, is made of wood cellulose fibers (non-critical material) scientifically built up and heat-treated to form rugged tubes with solid homogeneous wall structure. These tubes are then impregnated by special process to produce chemically inert, lightweight pipe with high me-



chanical strength and water resistance. Uses: (1) replaces metal conduit in installation of electrical cables; (2) serves as inside drain pipe to carry off rain water; (3) used as protective jacket to prolong life of metal pipe exposed to corrosive action of liquids or gases. In addition to uses already mentioned, certain types may offer possibilities as soil pipe as well as for drainage lines and as casing in shallow oil wells.—Brown Co., 500 Fifth Ave., New York City.

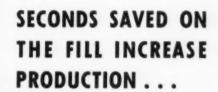


HARD LEAD CALKING FERRULE has been developed in 2-, 3- and 4-in. sizes to supply demand for durable sanitary plumbing installations using noncritical materials. May be welded or wiped to lead pipe. Amply strong and rigid to stand calking into cast-iron pipe with either lead wool or

cast-iron pipe with either lead wool or poured lead. Said to be found satisfactory at pressures exceeding those encountered in required plumbing tests. Use of these ferrules together with other lead plumbing installations which have been devised is said to conserve large amounts of critical materials and to expedite sound construction by avoiding priority delays.—Lead Industries Assoc.. 420 Lexington Ave.. New York City.

DUMPS BY GRAVITY





Koehring Dumptors dump the load by gravity...instantaneously. Just lightly trip lever, body latch releases, and load dumps. Sticky muck is loosened by the automatic kick-out pan. It's simple because gravity has no breakdowns...no worries ... only surplus speed. This surplus speed cuts round trip time...this time saved is your surplus production. Dumping by gravity...its immediate. Nature provides no mechanical delays.

KOEHRING COMPANY
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HEAVY-DUTY CONSTRUCTION EQUIPMENT





NOVO Diaphragm Pumps

Give your pump the proper care for long efficient life

FOR all NOVO Model AD Diaphragm Pump owners, we have a new 50-page book on how to care for these pumps, how to get long life and the best service. Give size of your pump, 3" or 4".

These pumps and their power units, are practically taken apart right before your eyes. Any operator can understand the instructions for operation and maintenance regardless of his previous experience.

Disassembled (explosion) views are shown from which to order parts. Each assembly illustrated with parts disassembled, but in the proper order. Every nut, stud, and lock washer shown. You can't go wrong even if you don't know the name of the part—just give the reference number on the part and the plate and page number.

An added Service for NOVO Pump Owners.

Send for your free copy. Give the size 3"or 4". Fectory overhaul of engine here.

FACTORY OVERHAUL
OF ENGINE
equipment

A factory overhaul for your Novo Engine regardless of the equipment on which it is mounted, Pump, Holst, Mixer, Light Plant, etc., will make the heart of that equipment practically new and these jobs carry a new equipment guarantee—See your Novo Distributor or write us for full information.

NOVO ENGINE COMPANY LANSING MICHIGAN



NEW TYPE SPATTERPROOF LAMP for welding and industrial service is made of special glass said to resist penetration of hot metal particles. Built to withstand severe handling. Equipped with T10 bulb with medium screw base. Sizes, 50, 75, 100 and 150 watts.—Radiant Lamp Cosp., 260 Sherman Ave., Newark, N. J.

PORTABLE ELECTRIC CAR SPOTTER is so balanced on channel iron frame that one man can lift one end and roll unit to any desired location. To use, frame is anchored with



chain, electric cord is plugged in, one end of haulage cable is hooked to car or object to be moved, other end is wrapped around capstan, motor is turned on and cable is fed away while machine does actual pulling.—Link-Belt Co., 307 N. Michigan Ave., Chicago.

MAINTENANCE DITCHER, called "Hystevator," for use of state and county highway departments with standard trucks is designed to take care of ditches along all types of roads. With this unit average output of maintenance crew is said to rise from seven or eight truckloads per day to twenty or thirty, thus increasing truck output 300 percent. One man operates bucket in ditch, driver handles truck



and third man improves appearance of ditch by trimming. Additional uses of Hystevator: loading oil rock from maintenance stockpiles, removing boulders from ditches, loading boulders for rip-rap work and handling various materials or equipment into dump or flat-bed trucks. Advantages: (1) Leaves ditch proper contour; (2) digs as it loads; (3) no separate power plant or power takeoff needed; (4) does not interfere with dumping; (5) does not cut down truck capacity; (6) is quickly installed or removed; (7) does not impede traffic; (8) does not straddle ditch, permitting work against cut banks; (9) truck remains on shoulder of highway without danger of getting stuck. — Willamette Hyster Co., Portland, Ore.

PARSONS



TRENCHERS Set Pace for Housing Projects Parsons' speed and dependability made them first in the field when

Parsons' speed and dependability made them first in the field when cantonments, airports and ordnance plants were constructed. And now Parsons Trenchers continue to set the pace in housing jobs throughout the country. Sewer, water, gas and electrical distribution systems must be completed first before homes can be built. Only because these machines are compactly built with alloy steels, anti-friction bearings and enclosed hardened gearing can uninterrupted, profitable operation continue. The original Parsons' patent — Offset Boom — permits excavations in narrow alleys or on road shoulders, making trenching possibilities unlimited. Speed and profit are easily available on housing projects with a Parsons Trencher.

SEE YOUR NEAREST DEALER TODAY.

Parsons Trencher cutting ditch between pavement edge and steep bank. Only an offset boom could work in these restricted quarters successfully.

THE PARSONS COMPANY · NEWTON, IOWA

TRENCHING EQUIPMENT





them do the work of four U-bolts, and they don't crimp and injure wire rope that we want to re-use."

Another says: "The 'finger-pinch' Ubolt clip wastes rope and clips. This 'Fist-Grip' Clip will help choke Hitler by saving time and metals."

These 3 Savings on the Job Mean More Guns, More Bullets

Saves Accidents - can't be put on wrong even by inexperienced men; doesn't weaken rope; greater holding

Saves Metals - 25% fewer clips do the job better, saving steel; no crushed rope ends; flush nuts - no battered threads.

Saves Time - fewer clips needed; nuts on opposite sides tighten easier, faster with any type wrench.

Greater holding power with 25% fewer clips

Distributed Through Mill Supply Houses Look for Laughlin Products in Thomas' Register



Unavoidably crimp, distort and bow wire rope with this "finger-pinching" action, causing reverse strains when load is applied.



LAUGHLIN "FIST-GRIP" SAFETY CLIPS

Hold rope in smooth, vise-like grip, with no reverse bends under load and no protruding threads to become battered and spoiled.















NEW HOPPER ATTACHMENT for standard lift trucks now makes possible convenient and economical method of handling bulk mate-rials. Designed for use with standard fork attachment, hopper is available in various sizes. To provide firm carrying position and to permit rapid tilting in dumping hopper loads, at-



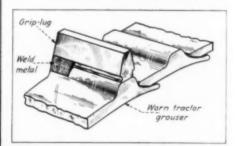
tachment is carried directly on fork support tachment is carried directly on fork support bar of lift truck by hook arrangement, an integral part of hopper. Gate is opened for discharge by pulling down hand lever positioned within easy reach of operator. Quick complete emptying is assured by slanting hopper bottom. Gate is closed by gravity and is secured by automatic catch-latch. Claimed to be especially suitable for handling of small parts and bulk materials chuted from storage bins and discharged from production machines. – Tow-motor Corp., 1228 E. 152nd St., Cleveland, Ohio.



FINISH COAT FOR MASONRY, in color, called "Colorthru" is said to need no priming or undercoat and when brushed or sprayed on undercoat and when brushed or sprayed on floors and walls is claimed to penetrate, preserve and beautify concrete, brick, stucco, and cement, either inside or outside, painted or unpainted. May be applied to old or new masonry, even when wet. No priming is necessary, effecting 50 percent saving in labor which usually figures 80 percent of total cost of paint job. One gallon covers 400 sq. ft.—Colorthru. 20 W. 45th St., New York, N. Y.



TRACTOR GRIP-LUG when applied to worn tractor grousers is claimed not only to reduce expensive replacement costs, but also to save time and labor by increasing traction. Made of work-hardening alloy steel and easily weld-



GRIP-LUG partly welded to worn grouser.

ed to worn grouser. Grooved and beveled on both sides to facilitate laying welding bead along edge. Special shape of grip-lug said to provide additional strength. Welded metal forms and holds like vise in and around grooves and bevels. Any high grade steel electrodes may be used—either ac. or dc.—Allied Steel Products, Inc., Cleveland, Ohio.



SHOVELS CRANES DRAGLINES

LIMA

SHOVELS, %YD. TO 3½ YD. CRANES, 13 TONS TO 65 TONS DRAGLINES, VARIABLE

Either way-ma



CRUSHING PLANT

A complete unit—rapidly set up, in-expensive to operate, insuring large capacity, very little vibration. Crush-ing, elevating, washing, screening done on spot, materials stored in Reliance Steel or Wood Bins (com-pletely fabricated, easy to erect). Experienced contractors put these Reliance Units together quick to meet any job capacity—at a profit. You, too, will do well to investigate.



Whather you use this Reliance Portable Crusher alone or in combinaable Crusher alone or in combina-tion with an Elevator, Chute Screen, etc., you can get no better value for your money in terms of capacity, low operating cost and rugged durability. The Reliance Crusher is famous for its strength and simplicity. It is particularly stable. A "swell" buy for crushing on any job. Send for detailed circular.



PRODUCTS:

Religion offers a complete line of Rock Crushers: Bucket Elevators: Revolving Screens; Storage Bins; Pulverisers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders Conveyors; Griszlies; Air Separators; Sand and Gravel Spreaders; Wash Boses.

UNIVERSAL ROAD MACHINERY COMPANY

KINGSTON, N. Y., U. S. A.

DISTRIBUTORS in ALL PRINCIPAL CITIES of U.S.A.

Expand your present TRUCK'S SERVICE

Use DAVEY



• Today it is essential that every available truck be utilized 24 hours a day 7 days a week. Speed is vital to our War construction program. Here is a suggestion on how to make your present trucks do more work without impairing their present duties.

This compact unit makes available existing power by merely installing the Davey Split Propeller Power Take-Off. This power may be utilized for various uses - to drive an air compressor - an electric generator set - an electric welder and in many other ways to speed up construction work of all kinds.

Keep your truck power busy constantly with a Davey Split Propeller Power Take-Off and thus do more work with less equipment.

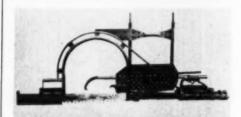
This unit is adaptable to new or old trucks.

DAVEY COMPRESSOR CO.

Power Take-Off Division KENT, OHIO . U.S.A.

Davey also builds a full line of heavy duty portable and industrial compressors, pneumatic saws and pole hole diggers.

NEWLY IMPROVED 24-IN. PNEUMATIC SAW now being supplied to armed services and to industries with adequate priorities offers fol-lowing advantages: (1) Holder rack takes up thrust; (2) can wedge quicker because of nar



row blade; (3) saw takes $\frac{1}{8}$ -in. cut against $\frac{4}{8}$ -in. cut made by standard chain saw; (4) blade utilizes standard saw teeth and can be sharpened in same manner as hand saw (5) no special equipment required for mainto, no special equipment required for maintenance of saw; low priced blades may be utilized; blades quickly obtainable in any emergency.—Davey Compressor Co., Kent. Ohio.

SPRAY GUN WITH PLASTIC BODY, now available with priority order for use in shipyards, aircraft factories and munitions plants, weighs 1/4 lb. less than spray gun with aluminum



body which it replaces. Said to have good body which it replaces, Said to have good chemical resistance and not to be affected by thinners, solvents or paint removers. Smooth black surface is easy to clean. — Eclipse Air Brush Co., Inc., 390 Park Ave., Newark, N. J.

AIR-FILTERING CARTRIDGE for insertion into face of R-1,000 respirator protects lungs against combination of all types of dusts, including toxic, pneumoconiosis-producing and nuisance dusts. Two other cartridges designed



to protect construction workers against mon respiratory hazards are: Type A which minimizes effects of dusts in mining, quarry-ing and tunneling, and Type CCI for low concentrations of light organic fumes, vapors and gases in paint spraying and cementing.

The American Optical Co., Southbridge.







Whatever your big job is, you've got a small but important job to see that wire rope is properly cared for on your equipment. To help you, Roebling has assembled a wealth of conservation data on convenient tags that operating men can fasten right on to reels and equipment. It's a simple, handy way to remind and instruct them about such vital precautions as:

- 1-PROPER INSTALLATION
- 2-CORRECT SPOOLING
- 3-PROPER USE OF CLIPS
- 4-REGULAR LUBRICATION
- 5-FREQUENT INSPECTION
- 6-CAREFUL OPERATION

Our nearest office will gladly furnish as many copies of this tag as you need. Ask for Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY Branches and Warehouses in Principal Cities

March 1943 - CONSTRUCTION METHODS - Page 95



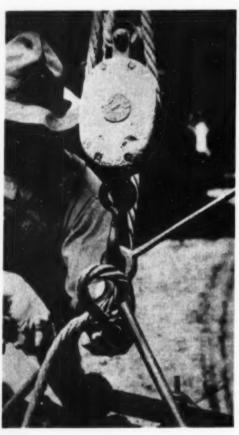
Look to Your Staging

IS IT SAFE, STRONG, SERVICEABLE?

IN THE CONSTRUCTION OF temporary wooden scaffolds and staging, contractors sometimes make the mistake of using inferior material, quickly assembled, on the theory that it will be good enough for the short time it will be used. Besides, why waste valuable lumber for such a purpose? When you erect a scaffold, don't skimp on quality or quantity. Build it with a generous safety factor.

Ropes, blocks and tackle, cornice hooks and all other equipment used in connection with hanging scaffolds, ought to be of the best quality obtainable. They should be inspected thoroughly and frequently and tested from time to time.

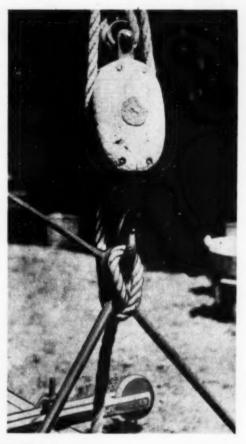
Users of scaffolds should be almost as expert as sailors in making secure knots and hitches. They should know how to attach ropes safely to objects of various



LOOP made in suspension rope is passed under scaffold-iron and caught over hook.

shapes and how to handle them properly under all working conditions. Otherwise, even well-built staging may be unsafe when it is suspended.

Generally speaking, stationary scaffolds and staging are used for interior and swinging scaffolds for outside work. Stationary scaffolds are of several types. The independent pole-scaffold is often



ROPE is then drawn snug and carefully adjusted so that part under tension lies below free end and presses it firmly up into angle or V at top of scaffold-iron.

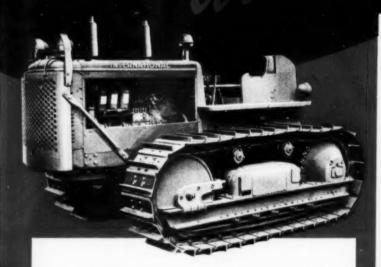
used in large buildings. It consists of uprights resting on the floor, with cross pieces secured to the uprights to hold the plank platform on which the workmen stand.

For smaller jobs, horse scaffolds ordinarily are used. Another type consists of double ladders hinged together at the top, with platform planks resting on the rungs. Short ladders of special form, leaning against walls, often are used to support planks of platforms. Makeshift arrangements of barrels, boxes and planks are risky and should not be used.

All scaffolds and stagings should be made of first-class materials and should be built by experienced men. They should rest on substantial foundations or supports and be braced so that there will be no sway in any direction. Guardrails and toe-boards should be provided on all scaffold platforms that are more than 5 ft. above the floor or ground.

The swinging scaffold consists of a

(Continued on page 98)



NORMALLY International Harvester would be announcing new 1943 International TracTrac-Tors about this time of year. But this is wartime, and traditional "new models" have been discontinued for the duration.

Just the same, there's a great line of TracTracTors rolling off our factory assembly lines. We call them Victory TracTracTors. They're all built to Victory (military) specifications. Most of them are going to the Armed Forces. A limited number are available for civilian use on essential construction jobs.

Users who qualify for these Victory TracTracTors get machines equipped as shown here. Much of this equipment is normally considered as "attachments." Today it is "standard." These tractors are frozen in design, and users get the benefit of extra equipment to do essential war-winning jobs. Each tractor is a winner in its power range. Each one is ready to tackle the toughest work and get it done!

Ask the International Industrial Power dealer about Victory TracTracTors and your eligibility. Meanwhile, take good care of the Internationals you have. Rely on International Service to help keep them operating efficiently. Work out a systematic preventive maintenance program with the International dealer. Yours for Victory.

INTERNATIONAL HARVESTER COMPANY

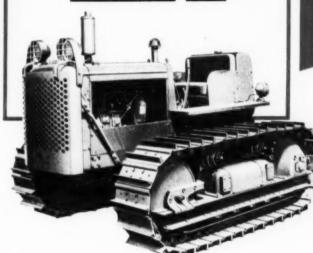
180 North Michigan Avenue

Chicago, Illinois

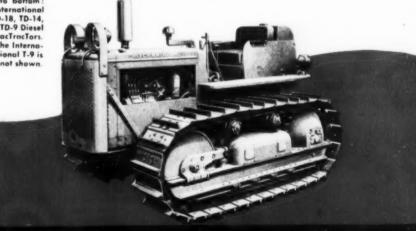
INTERNATIONAL

VICTORY TracTracTors

Built to Victory Specifications—for Release to Users on Essential **Construction Work**



Top to bettem International TD-18, TD-14, and TD-9 Diesel TracTracTors.
The Internaional T-9 is









Mercer-that's MY Crane! It picks 'em up and puts 'em down just like it was no effort at all! You'll go a long way, Buddy, before you'll find a Mercer Crane that can't take it!"

3, 5 and 7 Ton Capacities!

Compact, fast, sturdy...they deliver hard, continuous service at low cost. Gasoline-powered . . . one-man operation. Single or double-drum hoists. Cushion rubber or pneumatic tires. Special booms and heads for every type of lifting, carrying and loading. Parts standardization means simple adjustment and servicing in the field. Our new Catalog No. 65 completely illustrates and describes the entire line. Write for your copy today.



To assist Mercer Crane Operators and help conserve equipment, we offer a group of "Maximum Load Finders" covering all models. These jumperpocket size "rules", shown at the left, tell the operator at a glance exactly the maximum load he can safely carry at various distances in front of the bumper plate. These handy godgets are yours for the asking!



MERCER ENGINEERING WORKS, INC.

Materials Handling Equipment 30 CHURCH STREET, NEW YORK, N. Y. WORKS: Clifton (Allwood), N. J.

(Continued from page 96)

short, light platform supported by ropes that are attached to the building at the eaves or at some other elevated point. The platform itself often consists of boards laid upon a horizontal ladder of special construction, its side-bars parallel and somewhat farther apart than usual. Each end of the platform is supported by an iron stirrup or hanger which also serves for attaching the suspension ropes. The hangers should be so formed that guard-rails can easily be attached to them, to protect men from falling off the platform.

The suspension ropes are arranged to run through block's so that the painter

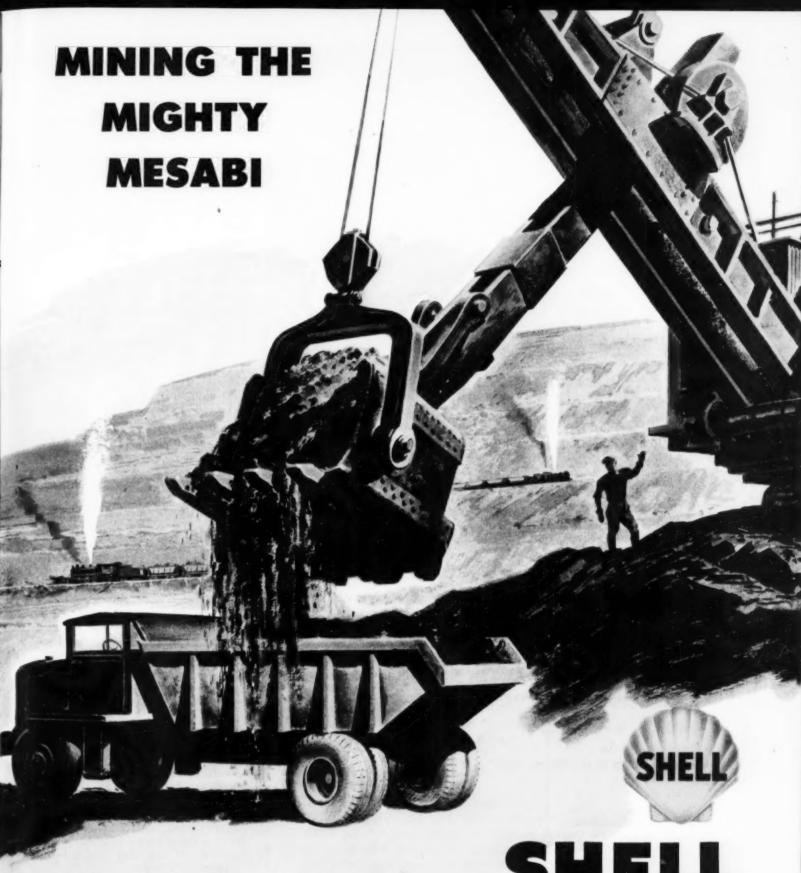


FREE END OF ROPE is finally drawn forward under scaffold-iron and caught loosely over hook.

can easily raise and lower the staging. the hook of the lower block engaging in an eye or loop in the upper part of the hanger. The "fall" rope is made fast to the point of the hook. It is essential that every workman who uses a scaffold know how to fasten the ropes safely, as shown in the accompanying photographs.

The free rope of each "fall" should be coiled up on the scaffold platform where it will be under full control of the workmen. If the coil cannot be left on the platform, the rope may be neatly coiled in a barrel on the ground. Under no circumstances should the "fall" rope be fastened to the building. If this is

(Continued on page 100)



MORE than 66,000,000 tons of iron ore were removed in 1941 from the fabulous Mesabi Range in Minnesota. Under war pressure over 70,000,000 were mined in 1942, while officials estimate the 1943 tonnage will be substantially higher. It is significant that most of the trucks, tractors and shovels operating on the Mesabi Range use Shell Lubricants and Fuels.

Let us show you how Shell can fill your Diesel needs.

SHELL DIESEL LUBRICANTS

For Heavy Duty



How can I lick that jacking job when I can't spare the men?

For You:

Many Questions This New

Bulletin V-43 Can Answer

How can we put in an ell TODAY without waiting for factory-bent pipe?

How can we move that big machine?

How can we straighten that shaft — and with what?

How can we get a powerful hydraulic press — quick?

How can we meet that "Proof-load" test?

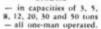
There are probably dozens of similar questions that you ask yourself every day. This Bulletin has the answers. Get a copy from your Blackhawk Industrial Distributor — or send the coupon.

A Product of BLACKHAWK MFG. CO.

BLACKHAWK
WORLD'S LARGEST MANUFACTURER OF HYDRAULIC JACKS

This Bulletin Shows Big Range of Blackhawk Hydraulic Equipment available today for war work.

HYDRAULIC HAND



GAUGE-EQUIPPED JACKS

 most economical and portable testing equipment for the field, shop and laboratory.

WHEELED SERVICE

 for maintenance and parking of material handling vehicles.

REMOTELY CON-

-- in capacities of 7, 10, 20 and 50 tons for doing 1001 assembly, maintenance and repair jobs in safety.

PORTO-POWER PIPE BENDERS

-portable, for bending pipe and rigid conduit up to 4" in diameter, right on the job.

BLACKHAWK MFG. CO.
Dept. M2333, Milwaukee, Wis.
Dept. M2333, Milwaukee, Wis.
Rush your new Bulletin
Blackhawk Hydraulic Equipment
for speeding up war work.

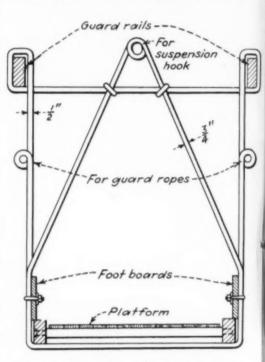
Name Company Address

(Continued from page 98)

done, an extra strain is imposed on the suspension ropes and tackle.

The "sky" or cornice hooks which are commonly used to attach the swinging scaffold to the building must, of course, have a large safety factor. They should be formed of first-class material and have a generous cross-sectional area. Every time the cornice hooks are used they ought to be carefully examined for flaws. They can be tested by "ringing" them on a cement sidewalk or in some similar manner.

It is a good idea, too, to make occasional dead-weight tests of the equipment. This can be done by suspending the scaffold a foot or so above the ground, then loading the platform with at least four times the greatest weight



PROPERLY CONSTRUCTED SCAFFOLD built with due regard for safety of workmen who use it.

that it will be expected to support while in use. Tests of this kind go a long way toward assuring the safety of the hooks, blocks and tackle.

The cornice or other parts of the building on which the hooks depend for support must be strong and secure. If there is the slightest possibility that the hooks might slip, they should be lashed in place with ropes.

No one should be allowed to jump off or on scaffolds. Neither should workmen be allowed to slide down or climb up the ropes on suspended scaffolds. Don't risk injury to passersby by hanging tools or paint buckets on the back rails of scaffolds. All loose objects, tools and materials should be removed from scaffolds when the workmen stop work for lunch and at the end of the day. When the scaffold is swung over a walk or other passageway, fasten a canvas drop under the platform.



The unloading operation of a Heil Cable Scraper is a honey to watch. Your operator drives onto the fill at hauling speed without the necessity of shifting gears, because the low line pull required to work the tilting floor does not stall the tractor motor. He spreads all the load smoothly and evenly at high speed with no sticking in the bowl, even in wet, sticky soils . . . Such performance is possible only because Heil engineers have done a thorough job of designing a big-capacity cable scoop for

speed, flexibility, and scientific weight distribution—to help you get bigger yardage at lower cost, along with a reputation as a successful operator . . . Use Heil dirt moving equipment, for maximum yardage per hour and maximum productive hours on the job, through easier maintenance, longer life, and simpler field repairs. Write for bulletins describing other Heil design features such as correct bowl design, scientifically located draft-pivot point, fulcrum-type lift, all-welded construction, etc., etc.

View of empty bowl, showing tilting floor in practically vertical position at the end of the unload cycle. TILTING A LOAD
REQUIRES LESS EFFORT
THAN PUSHING IT

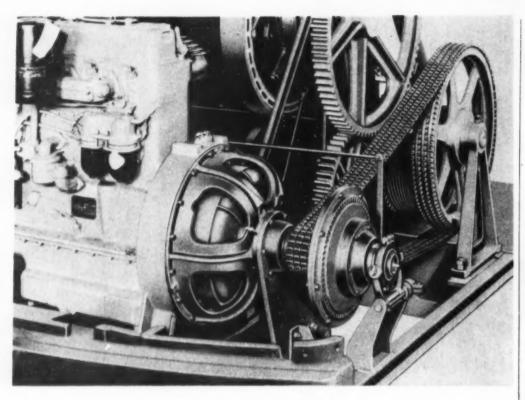


It requires less power to raise and dump a load than to slide it forward against friction. Tilting also gives greatest leverage at the start of the unloading cycle, when the load is heaviest—and a speed-up as the load is dumped, maintaining an even discharge.

The HEIL Company is engaged in all-out war production for Victory

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GENERAL OFFICES: MILWAUKEE, WISCONSIN

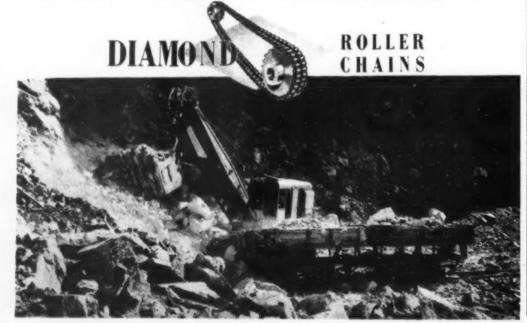


Where Power Transfer Must Not Fail

 With the highly efficient power plants and advanced engineering found in present day construction machinery — means of transferring the power to useful work is not overlooked by leading machinery manufacturers.

Diamond Roller Chain Drives are well chosen — because high maintained efficiency cuts power losses, — because elasticity, durability, and reserve strength, and ability to withstand shock loading and long hours of operation mean fewer delays and more yardage.

Experienced contractors and machine operators know this—and make sure that the chain drives on the machinery they buy and any replacement chain needed carry the "Diamond" on the links. . . . DIAMOND CHAIN & MFG. CO., 418 Kentucky Ave., Indianapolis, Indiana. Offices and Distributors in All Principal Cities.



Page 102 - CONSTRUCTION METHODS - March 1943

MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.



WROUGHT IRON FOR UNDERGROUND SERV-ICES — A. M. Byers Co.. Pittsburgh. Pa. (36 pp., illustrated.) Designed to be of service to private and municipal water-works engineers, electrical and civil engineers, oil and gas operators and plant maintenance men, this booklet discusses most important factors effecting soil confactors effecting effecting soil confactors effecting effect

rosion of underground piping, weighs theory against test results and outlines installation histories of water wells and lines, lawn sprinkler piping, oil and gas wells and lines, gasoline lines and tanks and electrical cable con-

* * *

COLD-WEATHER ASPHALT CONSTRUCTION—The Asphalt Institute, 801 Second Ave., New York, N. Y. (4 pp., illustrated) Folder recommends construction procedure to be followed when placing hot-laid asphaltic concrete in freezing weather. Complete progress chart for one project shows daily and hourly tonnages placed with temperatures ranging down to 5 deg. F.

* * *

EXPLOSIVES FOR DITCHING, ROCK AND BOULDER BLASTING AND STUMP BLASTING—Atlas Powder Co., Wilmington, Del. (60 pp., illustrated.) New publication detailing use of explosives in ditching, stumping and rock and boulder blasting in construction and army demolition besides forestry, agriculture and lumbering is now available to users of explosives. In addition to material on ditching there is information on soil blasting, gully control, land clearing and fire control. General discussion of explosives and principles on which they work is included.

* * *

ARC-WELDING ACCESSORIES FOR WOMEN

General Electric Co., Industrial Dept., Schenectady, N. Y. (12-p. booklet in color.) Presents in word and picture complete line of safety clothing and equipment.

AM NEURIN MENDING MENDING ACCESSORIES of Contents of Content

in word and picture complete line of safety clothing and equipment designed for country's steadily increasing army of women welding operators. Items described and illustrated: tailored leather welding jackets, sleeves, aprons and gloves; flameproofed duck aprons and sleevelets; special flameproofed hat designed by Sally



Victor to protect hair from sparks and flying slag; protective goggles, ventilated handshields and plain and flip-front ventilated welding helmets. Final section devoted to various types of insulated metal electrode holders and miscellaneous welding equipment, such as slag chippers, scratch brushes and filletweld gages.



MICHIGAN CRANES - - Always "ready and waiting" - - never waited upon. In this scene the Michigan has previously placed into stock pile, from railroad siding, the cast iron pipe now being loaded on to truck for delivery to job site - - but that's only HALF the story! The completely mobile Michigan will "be there" when the truck arrives ready to unload and "set" the pipe in the trench at the field.

One crane serving both ends of the job - - not a minute lost. That's mobility! . . Borchert-Ingersoll Co., MICHIGAN dealers, know construction equipment - - that's why they recommend and placed three Michigan Tamden-Drive Cranes on this vital war project where "time saved" is the all important issue.



WORLD BATTLE FRONTS ARE PROV-ING GROUNDS FOR THE CLEAVER-BROOKS HEATING PRINCIPLE!

Effective use of the Cleaver-Brooks multi-pass, down-draft heating principle has been made in the construction of special mobile heating — sterilizing — disinfecting and distilling equipment now in service with our armed forces on all fronts.

For heating — circulating — pumping all grades and kinds of oils and bituminous materials in tank cars or storage, Cleaver-Brooks Tank Car Heaters or Pumping Boosters do the job faster save fuel, time and money. Write for information.

CLEAVER-BROOKS COMPANY

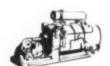
5125 No. 33rd STREET
MILWAUKEE WISCONSIN



CLEAVER-BROOKS TANK CAR HEATERS... BITUMINOUS BOOSTERS... AUTOMATIC STEAM PLANTS











GEORGE HAISS MFG. CO., INC., 139TH ST. & CANAL PL., NEW YORK

Timber A-Grames on Jacks Support Steel Trusses

(Continued from page 73)

92 ft. long. Before erection began, the A-frames were set 11/2 in, higher at the center than called for by the camber diagram. After the verticals, diagonals and top chord of the truss had been assembled, but before final riveting had started, the A-frames were lowered until only the pre-scribed camber remained. When the A-frames later were removed from the riveted truss, the final position of the bottom chord was level, as planned.

A crew of three men, each one using a specially built wrench with an 8-ft.-long pipe handle, adjusted the jacks. To equalize the loads on the jacks under an A-frame, the three jacks were adjusted simultaneously until the same effort was required on each wrench to move the load. For heavy lifts, three men sometimes would be used on a single wrench.

As a precaution, safety blocks and wedges were lightly tapped under the outer ends of the A-frame bottom timber after the frame had been adjusted to prescribed level. The wedged olocking helped to prevent vibration from working the jacks out of position and served as auxiliary support in event of any jack failure.

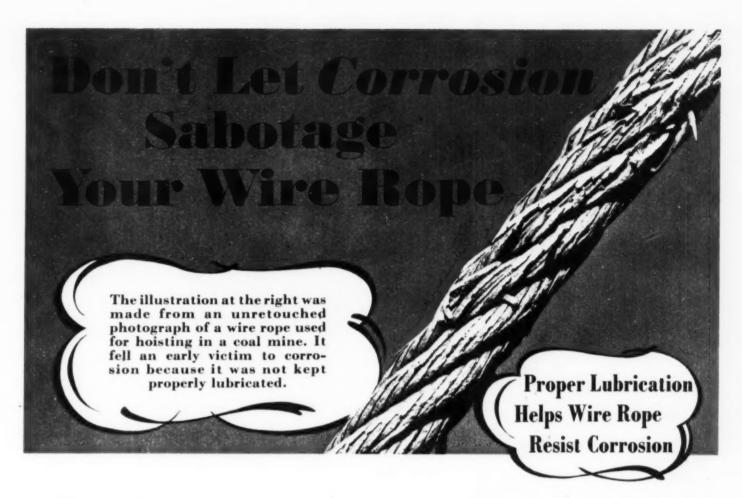
Handling Steel

In contrast with the 300-ft. trusses, the trusses for the 150-ft, spans were assembled complete on the ground and were raised bodily by two craneconverted 11/2-yd. shovels with 95-ft. booms. These cranes erected practically all steel in the building.

Steel shipments were controlled with the aid of an expediter for the contractor at the mill to assure delivery in proper order to the job. The longest pieces were the 92-ft. bottom chord sections of 10-ton weight, requiring three railroad flat cars; the heaviest were 13-ton column sections 55 ft. long.

To take full advantage of mill fabrication, sawtooth roof trusses spanning between the main trusses already mentioned were designed to come within a 171/2-ft. railroad clearance above top of rail when fabricated to full 65-ft, length and shipped in low-slung cars. Each car transported a group of these sawtooth longest pieces were the 92-ft. bottom

(Continued on page 106)



CORROSION is an enemy saboteur that is constantly trying to destroy your wire rope. Unless combatted by proper lubrication, normal rope life is greatly shortened and a serious hazard to safety created.

Wire Rope is an intricate machine with many "bearings". If it is to give the full service of which it is

actually capable, these points of contact—both externally and internally—must be kept correctly and adequately lubricated at all times.

The right kind of lubricant to use and the frequency with which it should be applied depends upon the conditions under which your rope is operating. When in doubt, we suggest you consult with an experienced wire rope manufacturer.

Now that steel is so urgently needed for so many implements of war, the more "work hours" you can get out of

> your wire ropes, the more steel you save for other vital purposes. So in all earnestness we repeat — Don't let Corrosion sabotage your wire rope.

* Important *

An idle wire rope is more vulnerable to corrosion than one in use, so be sure to give your ropes the protection of a good lubricant when they are not in service.

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(Continued from page 104)

trusses, inclined at a sidewise angle to fit the clearance height and held by rods which had to be burned off before the trusses could be unloaded. All steel was unloaded by crawler cranes.

Proper Care IMPROVES JACK SERVICE

(Continued from page 66)

particularly when they have been laid in clay or dirt.

Users of hydraulic jacks have a similar problem of keeping the jacks clean. It is important that the ram, as well as the extension screw that telescopes into the ram, be kept clean (Fig. 4).

Placing Jack Under Load

Jacks frequently are mishandled in placing them under the load. The capacity of any jack, irrespective of type, is based on the load's being placed squarely on the cap. Putting

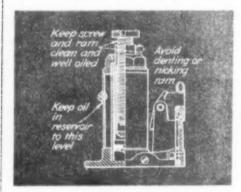
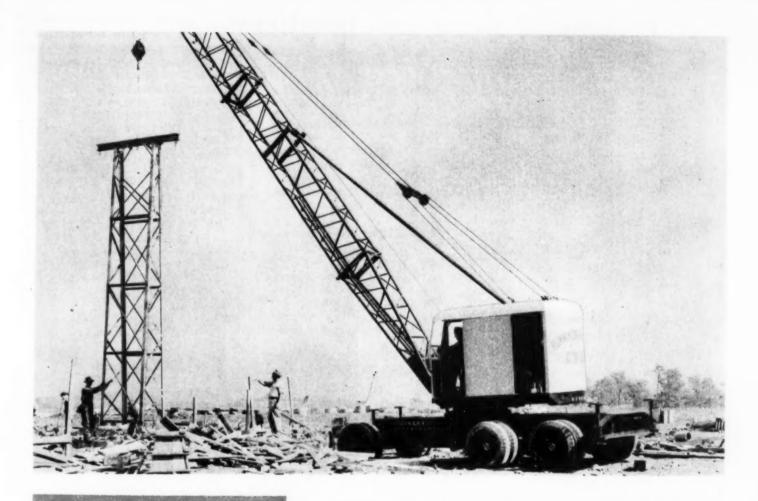


Fig. 4 . HYDRAULIC JACKS require simple maintenance for long life and full load capacity, particularly with reference to (a) keeping oil at correct level, (b) avoiding nicks and dents in ram, and (c) cleaning and oiling extension screw and ram.

the cap or toe lift only partially under the load places undue stress on rack bar, screw or ram, causing premature wear and sometimes damage to the jack. Furthermore, such off-center loading, Fig. 5(a), introduces additional hazards. A rotted beam which could sustain a load with the jack squarely under it may splinter if the jack is placed under the edge.

Whenever possible, blocking of sound, seasoned timber should be used under a jack, particularly when

(Continued on page 108)



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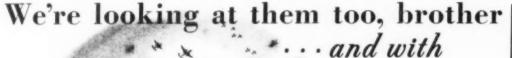
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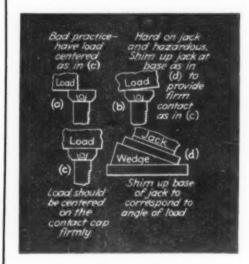
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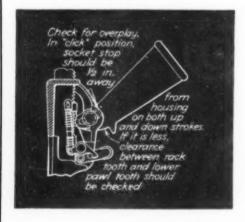
(Continued from page 106)

the jack is working out of doors. By spreading the load over a greater area, blocking under the jack protects floors from splintering or cracking and prevents the jack from being pushed down into earth or other soft material. Careful blocking under the jack further eliminates the danger that the load may be brought to bear against only part of the base.

Particular attention should be paid to blocking or shimming where the load is not parallel to the floor or ground. It is bad practice to have a load bearing on only part of the jack,



FULL CONTACT between load and Fig. 5... FULL CONTACT between load and head of jack is necessary for safety and utilization of jack's rated capacity. Jacking under edge of load (a) or at angle with load (b) is hazardous. Jack should be centered under load (c) and base should be shimmed up where necessary (d) to put head of jack in firm contact with load.



ON AUTOMATIC LOWERING JACKS, overplay should be checked by measuring clearance between jack housing and socket stop, with socket in "click" position. This opening (arrow) ought to be at least ½ on both up and down strokes when pawl tooth elick into rack teeth teeth click into rack teeth.

Fig. 5(b); the jack should be shimmed up in the manner indicated by Fig. 5(d) to put the cap and load in firm contact, Fig. 5(c).

In addition to the recommendations already noted, the following rules may

(Continued on page 110)

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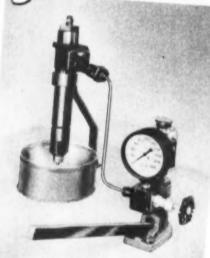
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(Continued from page 110) help to simplify the care and maintenance of common types of jacks.

· Automatic Lowering Jacks

- (1) Check overplay as indicated by Fig. 6.
- (2) Keep spring link clean. Dirt or caked grease interfere with proper spring tension. The spring link should be washed in kerosene occasionally.
- (3) Use correct size of lever bar or pole. Wrong sizes (Fig. 7) can damage sockets, and they are dangerous to use.

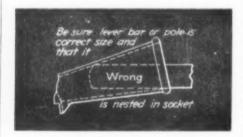


Fig. 7 . . WRONG SIZE of lever bar places needless stress on lever socket and can cause injury to operator by slippage. Lever bar or pole should be of correct size and shape to ht snugly into socket.

(4) Don't mishandle jacks by using them as mawls or by throwing them off trucks or dropping them from heights. Generally malleable, the jacks may not break, but they do get out of alignment.

Track or Trip Jacks

(1) Check overplay as noted in Fig. 8.

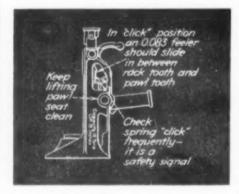


Fig. 8 . ON TRACK OR TRIP JACKS, socket stop should be at least $\frac{1}{2}$ in away from housing when pawl clicks into position on both up and down strokes. If it is less than $\frac{1}{2}$ in away, clearance between teeth should be checked with 0.083 feeler. If feeler will not enter, jack is not safe to use

- (2) Check spring "click" frequently. The "click" is important, because it is a signal that the pawl teeth are meshing properly with the rack teeth (Fig. 8).
- (3) Keep lifting pawl seat clean. Blow out dirt or wash with kerosene



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occasionally. Clean teeth will mesh properly, thus providing maximum bearing area and reducing wear on the teeth.

(4) Use poles or lever bars of the proper size. Using the wrong size (Fig. 7) involves dangers.

Screw Jacks

(1) Use machine oil for lubricating the screw and grease for the bearing under the cap (Figs. 2 and 9).

(2) Do not extend screw beyond the safe limit. Roughly, not more than two-thirds of the screw is to be run out. On Simplex screw jacks (Fig. 2), the screw is not to be extended beyond the safety peephole in the base.

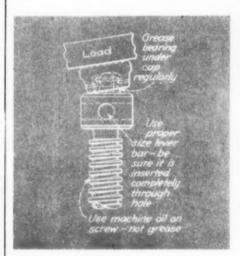


Fig. 9 MACHINE OIL, not grease, should be used in lubricating threads of screw jacks. Bearing under cap ought to be lubricated with grease. When screw is to be turned, operator should insert lever bar of correct size completely through hole.

(3) Use good blocking under base and above cap, if necessary. Placing a block under only half the base can be disastrous.

(4) Clean the screw and the housing occasionally to remove grit and then re-lubricate.

Journal Jacks

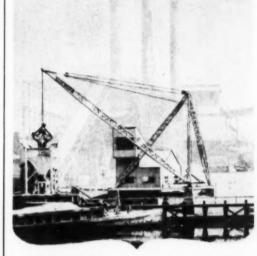
(1) Do not extend ram beyond indicator rings (Fig. 10). Generally a safety stop is provided.

(2) Operate the reversing plunger on the ratchet mechanism with the fingers; do not strike it with a tool.

(3) Be sure proper blocking is used, particularly when jacking or pushing at an angle. Improper blocking means uneven distribution of weight, tending to throw internal parts out of

(Continued on page 112)

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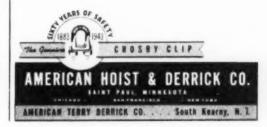
The demands of total war have made it impossible for us — like all other machinery manufacturers — to supply equipment for non-war purposes, but to owners of AMERICAN equipment we extend the assurance that we can still do much to help them keep their sturdy AMERICAN machines delivering a full day's work every day.

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(Continued from page 111)
line and causing sleeve to bind or scour.

(4) Keep the sleeve on the ram clean and free from nicks. A journal jack which is used only infrequently should be washed with kerosene once a year, the grit blown out and the ratchet mechanism and gears repacked with

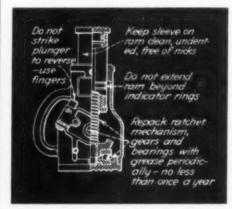


Fig. 10 ... JOURNAL JACKS can be properly maintained by observing few rules relating to: (a) sleeve on ram, (b) indicator rings marking safe limit for extending ram, (c) reversing plunger, and (d) ratchet mechanism, gears and bearings, requiring periodic repacking with grease.

grease (Fig. 10). A jack which is in regular use should be cleaned and greased three times a year. The base of a journal jack can be removed readily.

Hydraulic Jacks

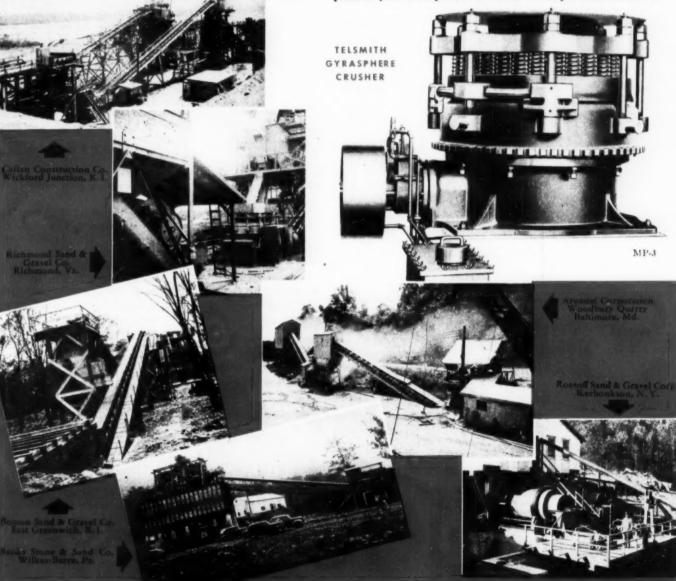
- (1) Keep oil in reservoirs at correct level (*Fig.* 4). Refill with proper grade of oil intended for the purpose. Do not expect maximum lift if reservoir lacks oil.
- (2) Keep the ram or sleeve as clean as possible and free of nicks and dents. A clean ram will not carry dirt down into the cylinder.
- (3) Do not use a longer lever bar than the one supplied with the jack. A longer lever makes it possible to lift a heavier load than the jack was built to lift, resulting in a damaged jack if not in an accident.
- (4) Pay particular attention to the blocking. Be sure it extends under the entire base, including the "pump" to one side of the housing or cylinder.
- (5) Be sure nuts at top and at base of housing are tight against leakage.
- (6) Take care that the release valve is not struck or damaged, especially on a hydraulic jack where the valve is not shielded.
 - (7) Do not throw a jack down; do (Continued on page 114)

Page 112 — CONSTRUCTION METHODS — March 1943

FOR WAR WORK **Aggregate Plants** ...by

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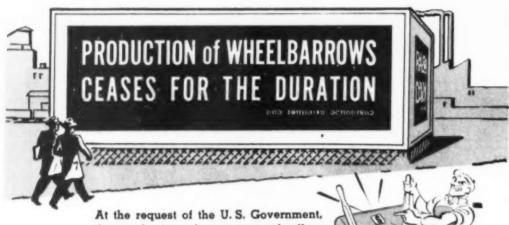
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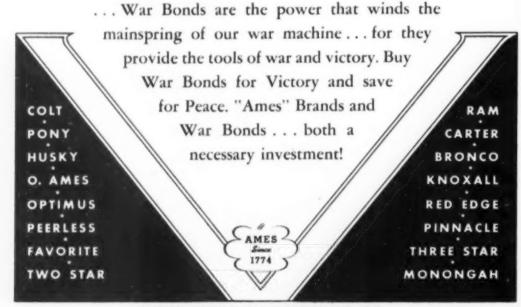
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(Continued from page 112)

not hammer it under a load. Never allow anything to strike the pump, as a blow against the pump may damage it beyond repair.

Observance of the foregoing rules will greatly increase the service life of jacks and will reduce maintenance as well. The time required to take these precautions is generally no longer than that needed to make repairs, and the cost is certainly less. Metal which might have been wasted in the past, through abuse and poor maintenance, now must be conserved

to help fight the nation's battles.

Cantilever Methods

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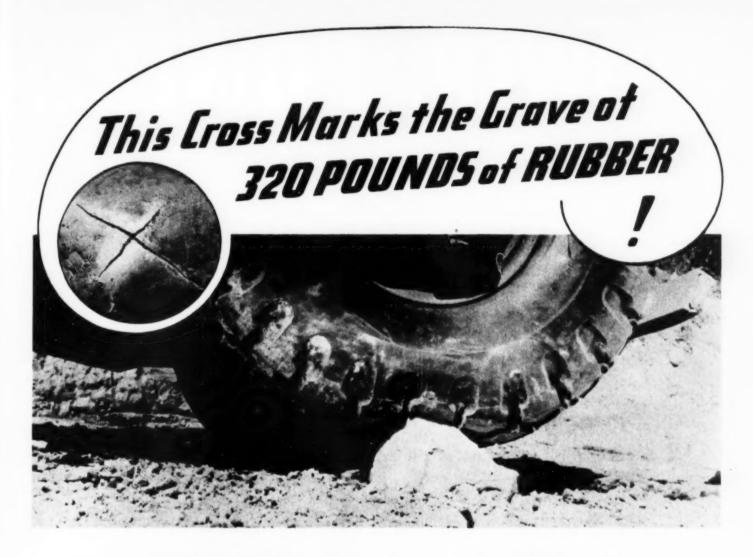
(Continued from page 51)

in position at only one point and not at two bearings on the same pier, as is customary. The fixed point is at the center of the east arch pier where a hollow steel pintle pin extends upward from the pier 9 in. into a heavy, box-section floor beam, which has its bottom cover plate built up to a thickness of 5 in. Expansion rollers at the two truss bearings on the pier allow some rotation about the pin, thus eliminating twisting of the pier caused by transverse wind loads.

Trusses are spaced 35 ft. apart, c. to c. All panels have a uniform length of 38 ft. 5 in. Depth of the arch trusses, between center lines of the chords, varies from 70 ft. over the piers to 24 ft. at the center of the span, where the lower chord is 102 ft. above the roadway. Clearance above high water at the center of the tiedarch span is 50 ft.

Including girder approaches, the bridge has a total length of 5,760 ft. between bearings on the abutments. The west approach, 1,448 ft. long, comprises 17 spans varying from 44 to 187 ft. in length. On the east side, an approach structure 2,758 ft. long is made up of 23 girder spans 82 to 184 ft. in length. Structural steel in the girder approaches amounted to

(Continued on page 118)



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advantage also in han-

ROGERS BROTHERS CORP. ALBION, PENNA.



(Continued from page 114) 3,190 tons. The bridge carries a 24-ft. reinforced-concrete roadway, with a 5-ft. concrete sidewalk on one side and an 18-in steel walkway on the other.

Straight Cantilever Erection

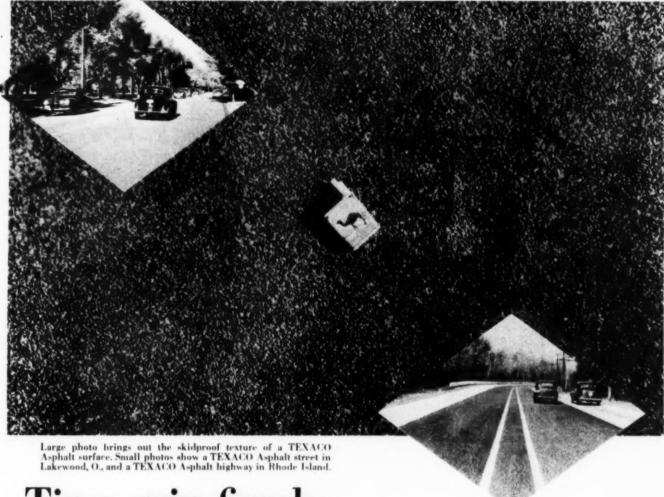
Steel erection for the west half of the truss bridge was begun at pier 17, the west end pier, by a traveling stiff-leg derrick on the deck of the adjacent approach span, previously erected. This rig erected the first two panels from the end pier to a steel falsework bent and then assembled a smaller 16-ton capacity traveling derrick on the deck of the erected panels. The latter derrick, with a 60-ton locomotive crane operating on tracks under the bridge, proceeded with erection of the next two panels to a second falsework bent on hydraulic jacks. After the erected panels had been riveted and swung by jacking up the forward bent, the rear bent was moved up to the fourth panel point to provide double supports, both controlled by hydraulic jacks. The double bent was maintained in active service even after the end span had been completed, until seven panels of the arch cantilever had been erected, for the purpose of taking wind stresses which could not be resisted by the link connections of the tiedowns at Pier 17.

As a start toward later eastward movement necessary in closing the arch, erection of the west half was begun 9 in. east of theoretical position. Cable ties were installed from Pier 17 to the second panel point of each truss to restrain the structure from drifting eastward as erection proceeded. Each tieback consisted of two parts of 1-in, wire rope.

For control of vertical movement at the ends of the trusses on Pier 17, temporary tiedowns of the type shown by an accompanying photograph were installed in place of the 8-ft.-long rocker links. The tiedown for each truss consisted of two 4-in.-dia. threaded rods pinned to the permanent shoe. By means of a 250-ton hydraulic jack placed in each tiedown between jacking blocks on the rods, the end of the bridge could be raised or lowered. Double sets of nuts locked the jacking blocks on the rods where desired.

With tiedowns and tiebacks in place at Pier 17, the 16-ton deck traveler extended steel erection beyond the double falsework bents to the fifth panel point and put a 35-ton-capacity creeper derrick on the top chords. The creeper rig erected the remaining panels of the side span to Pier 18, where the roller shoes were frozen in temporary position 10% in east of normal location by means of steel plates welded to the shoes. Be-

(Continued on page 121)



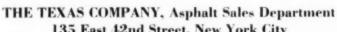
Tires grip firmly

on surfaces like these

Today more than ever, traffic accidents on streets and highways must be held to a minimum. Such accidents can result in the temporary or permanent disability of vital war workers, even members of our armed forces.

Skid-resistant TEXACO Asphalt pavements are helping in an important way to curtail accidents on streets and highways all the way from the Atlantic to the Rockies. TEXACO's tire-gripping texture materially helps the man at the steering wheel control his vehicle bring it safely through situations which might have led to costly accidents.

To the generally recognized long life and low upkeep of TEXACO Asphalt paving, add this third major advantage - the important contribution of skidproof TEXACO to safe driving.



Houston







Les Mécaniques Américaines Assurent la Victoire!

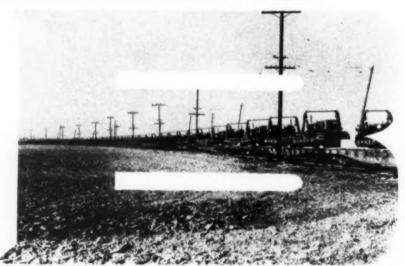
Yes, these fighting Free Frenchmen know a victor when they see one. They were licked once and they know what it took to do it — and they know we've got mechanization that will make their goose-stepping conquerors say "Uncle."

If you could see those Baker Hydraulic Bulldozers smoothing out North African sand dunes for airports, making camel trails into jeep roads, filling bomb craters at air bases and removing debris in ageold Islam villages before the bomb fragments have had a chance

to cool—you, too, would agree, "Victory is in the bag."

This war is more than tanks, guns and ships. On every front, Baker Bulldozers with their direct lift and tremendous hydraulic down pressure—not merely dependent on gravity or weight of blade—are leaving no stone unturned to insure a speedy victory. Send for a copy of "Unsung Heroes of War."

THE BAKER MFG. CO.
568 Stanford Ave. Springfield, Ill.



Baker Hydraulic Bulldozers and Construction Equipment have gone all-out for global war. Every unit leaving our plants is directly engaged in the war effort. We have evolved wartime production methods that will bring you better Bakers at lower cost after the war.



The Modern Tractor Equipment Line for LEVELING AND GRADE BUILDING SNOW REMOVAL ROAD MAINTENANCE

(Continued from page 118)

yond Pier 18, the top chord creeper continued with cantilever erection of the west half of the arch. During these erection operations, the landward end of the side span was held down about 3½ ft. below final elevation by the bolted tiedowns at the ends of the trusses.

Balanced Cantilever Method

In starting balanced cantilever erection over Pier 19 for the east half of the continuous-truss bridge, the erectors froze the roller shoes in position on the pier by welding steel plates to the shoes. On the east side of Pier 19, inclined falsework posts (each made up of two pieces from the tie chords for the middle span) were set from the base of the pier to the first panel point of the side span, as indicated by accompanying illustrations. Using these posts to form an auxiliary supporting bent, the erectors placed the



WITH CANTILEVER ERECTION of east side span completed to Pier 20, bolted tiedowns are installed at ends of trusses.

lower chords and deck system for two panels over the pier. This steel was erected from barges by a floating derrick, which then placed on the deck system a 30-ton-capacity guy derrick supported on a platform carriage traveling on steel rails. The guy derrick completed one panel to the west and three panels to the east and then assembled a 35-ton creeper derrick on the top chords over the pier.

Moving west, the creeper rig erected the cantilever arm of the arch while the guy derrick advanced east-

(Continued on page 124)

WHAT YOU CAN DO TO HELP THE WAR EFFORT!

Take good care of everything you own. This means literally everything . . , your business equipment, home appliances, automobile, clothing, furniture, kitchen utensils and other items too numerous to mention. The less replacement of civilian necessities of life is required, the more of the national effort can be devoted to war.

Make every effort to keep in good health, Illness, not only keeps you away from the job but may add to the already heavy burden of the doctors still in civilian practice and the hospitals that are operating under difficulties.

Be as economical as possible in the use of food, fuel and all kinds of household supplies. Even those products of which there are ample supplies, in this country must be transported and all transport facilities are heavily burdened.

Before making a telephone call, ask yourself if it is really necessary. The telephone lines are congested with war business and material is not available to permit expansion of communication systems.

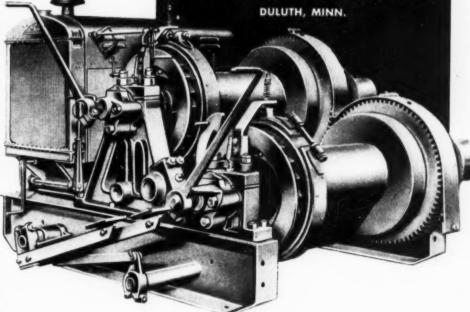
Reduce traveling as much as possible. It is hardly necessary to stress the importance of curtailed automobile travel. As for rail travel, the railroads are handling a tremendous and mounting load. Nonew passenger equipment is being built. Existing cars and locomotives must handle the traffic.

Comb your property for scrap iron and steel, rubber, copper and rags; 'turn these things in though local salvage channels.

Take extra good care of your construction equipment, Instruct your operator or maintenance man to give periodic check-ups to replace danger-ously worn parts; lubricate thoroughly at the required intervals; keep all wearing parts adjusted for efficient performance; paint when necessary to prevent rust and take precautions to protect radiators and pipes from freezing.



CLYDE IRON WORKS, Inc.



These users say...

"EASIER PLACING.



"We used Pozzolith in approximately 40,000 cubic yards of concrete supplied for The... Ordnance Depot. It required less water to produce the specified slump. Placing in the forms was helped by the good consistency of the mix. (photo at left) There was less bleeding and segregation . . . strengths ran higher."

BURDINE CONSTRUCTION CO. Shaw, Miss.

"In the construction of the East Chicago, Indiana waterworks filtration tank (photo not shown), we used slag concrete. By employing Pozzolith we were able to reduce the water in the mix 20%. Placement was easier . . concrete produced was very dense and watertight."

H. B. OLNEY, General Contractors and Engineers, East Ohicago, Indiana.

Po

sav

plet



"We are very well satisfied with the results obtained with the use of Pozzolith. In addition to the permanent improvement in the quality of the concrete through the use of less water, contractors on the five buildings in which we have specified Pozzolith, advise us that they were able to place the concrete more easily and obtain a better appearing job."

TINSLEY, McBROOM & HIGGINS, Architects, Des Moines, Iowa



MASTER

LESS POINTING-UP



"Our superintendent of construction reported that the concrete used in The... Aircraft Plant, designed with High Early Pozzolith, was exceptionally workable even though the water content of the mix was reduced 15-20%; that when forms were stripped... the concrete was entirely free from honeycomb. We were able to speed up construction, which permitted a more rapid reuse of forms, shores etc., and effected a savings on the job."

F. H. MARTIN CONSTRUCTION CO., General Contractors
Detroit, Michigan

Reports like these and many others show the outstanding results obtained with Pozzolith. After water has been reduced, mixes remain plastic and workable . . . strength and watertightness are increased . . . better concrete is produced . . . savings effected.

Write for illustrated Pozzolith booklet and the complete story on the economy and benefits of Cement Dispersion.

THE MASTER BUILDERS COMPANY, LTD.

In the U.S.A.: The Master Builders Co., Cleveland, Ohio

WHY POZZOLITH

The Cement Dispersing Agent

IMPROVES CONCRETE





"Flocculated"

Dispersed

Remember in physics how a group of suspended pith-balls would fly apart when given an electrostatic charge?



Flocculated

Diagram of Cement Suspended in Water Highly Magnified

Dispersed

Similarly, cement particles which bunch together in water (flocculate) are separated by this same electric force when Pozzolith is added to the mix. Thus cement surface area and vital surface reactions (hydration) are greatly increased, resulting in . . .

- Pozzolith putting more of the cement to work, by increasing hydration as much as 40%.
- Pozzolith increasing workability, producing up to 2½ times as much slump with the same amount of water.
- Pozzolith permitting up to 20% reduction in water, maintaining placeability . . . increasing strength . . . watertightness . . . and durability.

FOR DISPERSION IN MASONRY MORTARS...
Use "O. M." OMICRON MORTARPROOFING

BUILDERS



"Indispensable"-

says Indianapolis Power and Light Company

* Many reports of the capabilities and advantages of Marmon-Herrington All-W beel-Drive converted Ford trucks have come from military operations overseas. With Montgomery's British Eighth Army in Africa, in Australia, New Zealand and the Solomons, and in other vital areas, the superior tractive power of all wheels driving has been of tremendous value.

Here, at home, too, these vehicles, with their ability to operate through deep mud, sand and brush are equally appreciated. The unit shown has saved thousands of man hours for the war effort in digging over 10,000 pole holes in less than four years.... Take best care of the Marmon-Herringtons you have, and let War Bond purchases speed the day when you can buy more.



MARMON-HERRINGTON CO., Inc., INDIANAPOLIS, INDIANA

(Continued from page 121)

ward setting steelwork of the side span. Loads were maintained in close balance over Pier 19, as indicated by a maximum stress of 130 kips taken by each of the inclined posts of the temporary bent during erection. These posts had each been designed



PULLED DOWN about 3½ ft. below final elevation by two adjustable bolted tiedowns, deck of side span is considerably lower than floor steel of approach span in foreground.

for 480 kips in compression and 510 kips in tension.

Erection of the arch cantilever had advanced to the eighth top-chord panel point west of Pier 19 when the steel work of the side span reached Pier 20. At this stage of erection, the outer ends of the trusses over Pier 20 were about 2 ft. below final elevation. Tiedowns similar to those at Pier 17 were installed, and were adjusted to pull the ends of the trusses about $3\frac{1}{2}$ ft. low. Two additional panels then were added to the east half of the arch, leaving only the center section, two panels long, to be inserted for closure.

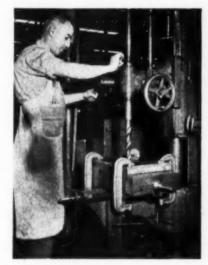
Arch Closure

At this time, with ten panels erected in each of the two halves of the arch, the deflection of the cantilever arms was about 2.4 ft. Horizontal openings in the chords, to be closed by moving the west half eastward, were 6% in. for the bottom chord and 7½ in. for the top chord.

To effect closure of the arch, the west half of the bridge was released by cutting the welded plates at the roller shoes on Pier 18 and by slacking off on the two cable ties from Pier 17 to the second panel point of the end span. Two 50-ton journal jacks set up at Pier 17 behind the ends of the two trusses furnished power to overcome inertia and frictional resistance at the bearings in moving the west half of the bridge forward

(Continued on page 126)

HOWAND WHY WILLIAMS' TOOLS AID WAR PRODUCTION



With "C" Clamps now widely used in many phases of war industry and construction, information on the various standard types is timely. Williams' Clamps are all dropforged from selected steel and heattreated. Screws are made of special steel, hardened and tempered. A description of the various Williams' patterns, for light, medium, heavy and special duty, follows:

WILLIAMS' "VULCAN" for heavy service



11 sizes, with maximum capacities from 3/4" to 12-1/2". Long screws can be furnished providing a minimum capacity of 0. Screws threaded U.S. Std.

"C" CLAMPS

WILLIAMS' "AGRIPPA"
for general service



8 sizes, with maximum capacities from 3" to 18". Fitted with dropforged swivel and screws having sliding pin handle, and threaded U.S. Std.

WILLIAMS' "DEEP THROAT" for light duty and welding



7 sizes, with maximum capacities from 2" to 12". Furnished in two finishes: Standard for general service; Sputter-Resisting for welding, completely cadmium-plated to resist adherence of welding spatter. Screws have special thread for strength and rapid adjustment.

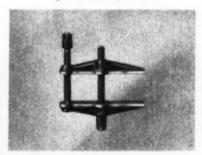
WILLIAMS' "VULCAN" TOOL-MAKERS CLAMPS



Furnished in 2 types: with plain and with swivel screw. Each type in 4 sizes, with maximum capacities as follows: plain screw, 1" to 4-1/4"; swivel screw. 3/4" to 4". All screws have wings shaped to permit use of lever in tightening. U.S. Std. thread.

WILLIAMS' "VULCAN" PARALLEL-JAW CLAMP

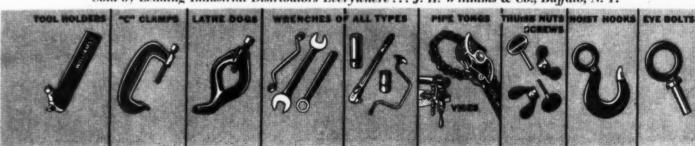
for Machinists' use



4 sizes, with maximum capacities from 1-1/4" to 4-1/4". Screws threaded U.S. Std.



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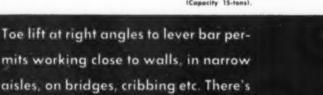
The OWEN BUCKET Co.

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Simplex No. 314, 10-ton jock. Roises on both up and down stroke. 22 ½" high; 13½" lift; side toe 2½" from ground level. Weight; 62 lbs. No. 304T is trip type. (Capacity 15-tons).



a Simplex for every construction jacking problem that arises.

TEMPLETON, KENLY & COMPANY CHICAGO

Better, Safer Construction Jacks Since 1899

Make Your Jacks Last Longer!

Send for bulletin on the proper care of jacks.



(Continued from page 124)

at a controlled rate. The load on these jacks was about 25 tons each.

Tiedowns at the two outer ends of the bridge already had been adjusted to put the cantilevered ends of the arch at the proper level for inserting the closure sections in the lower chords. The west half of the bridge was moved eastward until the final sections of the two lower chords came into bearing, and the lower chord connections then were pinned and holted

After the lower chords had been connected in this way at the center of the arch, the tiedowns at the two ends of the bridge were eased off in 3-in. increments until the top chord came into bearing on the top chord closure sections, which then were pinned and bolted. Less than 4 hr. elapsed from the moment the shoes at Pier 18 were released until arch closure was completed. At this stage, the outer ends of the trusses were about 31/4 ft. below final elevation. With the closing arch section bolted in place, the tiedowns were released to about 11/2 ft. below final elevation to put stress into the two chords of the arch and relieve the large negative moments over the arch piers.

Erecting Arch Ties

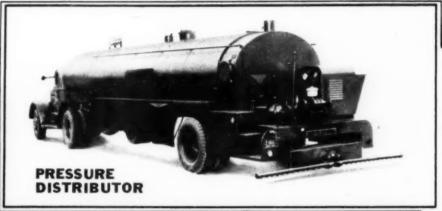
After the closure connections of the arch chords had been riveted, the creeper derricks backed down the two sides of the arch, erecting hangers, tie members, floor beams and bottom laterals of the deck system. When the ties had been completed except for closure of the final tie connection between panel points T12 and T13, a jacking yoke was placed across each tie opening to draw the tie together, as shown by a photograph in the department, How They Did It, of this issue. The pair of yokes, each made up of eight steel links with diaphragms attached, incorporating two 350-ton hydraulic jacks per tie, pulled the ties together as the jacks were extended to telescope the links. As the ties were brought to closure, the reactions at the outer ends of the trusses were reduced to zero. After closure had been completed, the 8-ft. steel rocker links at Piers 17 and 20 were installed by jacking under the end floor beams. The 16-ton traveler, working east from Pier 18, then erected the remainder of the floor system, including stringers, crossbeams, curbs and handrails.

Girder Erection

Girder approaches for the truss bridge are arranged in continuous units, ordinarily three spans in length, with expansion joints between units located a short distance from the piers. An accompanying photo-

(Continued on page 128)

AFTER VICTORY WHAT ARE YOUR PLANS?



Unconditional Surrender must come first!

Unconditional Surrender must come first! But while we are all working to the end, let's think of the future. Let's do some post war planning, too.
Plan so you'll be ready to put our vital Highway System back into tip top shape. Plan the equipment you'll need to do the job, the most efficient way. Plan to purchase Littleford Equipment to do modern Highway Building and Maintenance jobs.

Maintenance jobs.

The "Spray Master" Pressure Distributor applies bituminous materials faster, more efficiently, and at lower cost.

The "Tracker" Heaves will be at sort.

The "Tankar" Heater will heat tank cars of materials faster than any similar

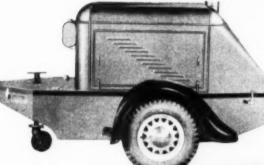
aris of materials faster than any similar unit, produces steam in 2 minutes time. The "Supply Tank" will transport the materials from the tank car to the Distributor on the job; frameless construction gives better load distribution. "Road Brooms" either power driven or traction driven sweep in either distribution.

rection. They sweep highways before applying matrials.

Stick to winning the war, but think of Littleford Black Top Road Equip-ment for making a better world for the

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The war has got us more than ever on the alert. New and better Homelite Generators—more portable, more powerful than ever—are daily rolling off our assembly line and going direct to our Armed Forces.

In design, in performance, and in the number of different units, Homelite has made tremendous forward strides. It doesn't mean much to you now—but after the war, your new Homelite Portable Pumps and Generators will be better performers than ever before.



* * *

Homelite workers have done their job well enough to earn the Army-Navy E—a good indication that they'll do their job well enough to meet your demands when peace is finally declared.

HOMELITE CORPORATION

Page 128 - CONSTRUCTION METHODS - March 1943

(Continued from page 126)

graph shows a typical rocker expansion joint between girder units.

In erecting the west approach, light girders for the first 13 spans, 44 to 97 ft. long, were set from the ground by a crawler crane of 25-ton capacity. The final four spans, 124 to 187 ft. long, of the 17-span approach, have deep haunch sections over three piers. In erecting these long spans-the 60-ton steam locomotive crane first set the haunch sections from the ground, and the intermediate lengths of girder then were raised by a deck traveler and spliced to the haunches. To raise the intermediate girder sections, the erectors put a 90-ton traveling stiff-leg derrick, with a capacity of 45 tons at 60-ft. radius, on the deck. This rig was equipped with a 100-ft. boom carrying a 25-ft. jib.

After completing the west approach, the large traveling stiff-leg derrick was moved to the Illinois side of the river and was set up by a 40ton-capacity crawler crane on girder spans less than 100 ft. long previously erected above the railroad tracks. From this point, the derrick advanced westward setting girders up to 122 ft. long, weighing 35 tons. Steel members were delivered to the derrick by a three-wheeled gasoline-powered carrier running on steel rails on the girders. The final four spans, 142 to 184 ft. long, included deep haunch sections over the piers. These girders were erected by the same method employed for long spans on the west side of the river, with the exception that the haunches were set by floating derrick.

Deck Paving

Reinforced-concrete deck has been placed on the west approach and the remainder of the bridge will be paved in the spring, in time to open the crossing to traffic early in 1943. In paving the three-span continuous truss unit, concreting will start at the center of the tied arch, and successive sections of deck will be placed simultaneously on the two halves of the structure to maintain a balanced load on the bridge.

Direction

Howard, Needles, Tammen & Bergendoff, Kansas City, Mo., are designing and supervising engineers for the City of Dubuque Bridge Commission. Representing the engineering firm, Ivan P. Hanson is resident engineer in charge of operations on the project. All steelwork and deck construction for the bridge are included in a \$1,588,000 contract of the Bethlehem Steel Co., for which W. W. Oskin is resident engineer and J. E. Campbell is superintendent. A substructure contract for \$832,000 was executed by

(Continued on page 130)

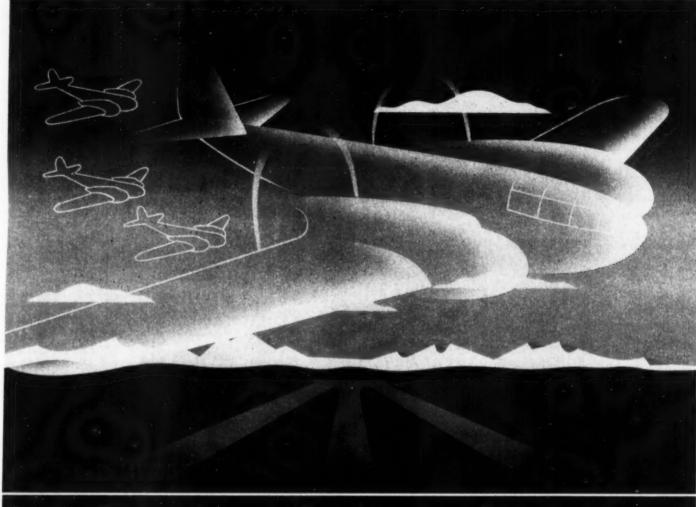
How Sam

Tachair get t bluer cold

Early time speed milita army

And found floors the la sider

MEN MEN



Preview of a busy airport

How would you get the hangars and buildings up quickly for Uncle Sam? How save time in wartime...especially in the middle of winter?

This airport-in-the-making will be an important link in the nation's chain of military fields. But how to get the finished structures off the blueprints quickly? The weather is cold for concreting. Time is short.

Here's a natural for Atlas High-Early cement. It's the type of wartime job that this product has been speeding for industry, war housing, military roads, naval bases, and army camps.

And in using this cement to speed foundations, structural supports, floors, walls and ramps, and finish the last runway for this airport, consider the other advantages in addition to time-saving which Atlas High-Early often makes possible—savings in lumber and fuel—savings in labor, in release of equipment such as tarpaulins and salamanders more quickly for new work, in earlier use of concrete, and earlier occupancy by owner.

If your essential job is a "Rush" (and what wartime job isn't?), then look to Atlas High-Early cement to give you serviceable, durable concrete several times faster than standard portland cement. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York.

CHECK ON ATLAS HIGH-EARLY for Wartime Construction

Atlas high-Early cement gains strength rapidly —produces serviceable concrete in one-fifth the usual time on some jobs.

- 1. Permits earlier use of concrete, and thus gives owner earlier occupancy.
- 2. Soves manpower when such conservation is needed most—releases men for new jobs more quickly.
- 3. Conserves lumber. Forms may be stripped sooner—often in 24 hours instead of from 3 to 5 days—and re-used. Hence fewer sets of forms may be needed, saving time, labor, and lumber.
- 4. Shortens time required for protection and curing as much as 70%. This saves fuel and releases tarpaulins and salamanders for other work.
- 5. Reduces overhead by saving time, manpower and equipment.

CM-H-51

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SAVE TIME IN WARTIME WITH

Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

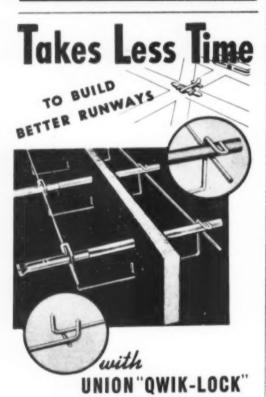
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WITH AN I. B. BUCKET

Properly designed -as a result of over 50 years experience -Industrial Brownhoist buckets are light in weight yet of extra sturdy construction. Large sheaves reduce rope wear and maintenance to a minimum. Deep clean bites practically eliminate hand shoveling. Standard types (rope-reeve. power-wheel, linktype) in stock for immediate delivery. Write for complete information.



NDUSTRIAL BROWNHOIST



Union "Owik-Lock" Airplane Runway Expansimplify installation of dowels and joint material and accurate, locking and alignment of dowels. They are designed for fool-proof, trouble-free functioning.

Write for Catalog of Construction Accessories.





(Continued from page 128)

the Ferd J. Robers Construction Co., Burlington, Wis., and the LaCrosse Dredging Corp., Minneapolis, Minn., as described in Construction Methods, May 1942, p. 46.

Charles P. Landon is chairman of the five-man bridge commission, created by act of Congress to build the project, which involves a total expenditure of about \$3,500,000.

Dual-Drum

Lay Airfield Pavement

(Continued from page 58)

curred during an unusually wet summer, the contractors combatted the effects of the water on the natural clay subgrade by pulling the steel road forms and putting a bed of sand under them to prevent settlement. In this way, the paving equipment was able to continue operating throughout any but the hardest rain.

Grading Outfit - Unimpeded progress of the paving work was made possible by a grading outfit which comprised sufficient equipment to assure completion of earth moving ahead of the pavers. Grading requirements of the job originally were estimated at about 250,000 cu.yd., but in the course of the work this figure had to be revised upward to nearly 500,000 cu.yd. Eleven tractor-scraper units of 10-yd. average capacity and two 42-in. elevating graders loading an average of twenty trucks, mostly 8-10-yd. size, moved the clay ahead of the paving operations. In the fills, the clay was spread in layers and was compacted by sheepsfoot tamping rollers. Nine motor patrol graders, in addition to bulldozers, worked on fill layers and on finish grade for pavement.

Daily Paving Progress

Handling 381/2-cu.ft. batches on a 60-sec. mixing cycle for each batch from skip-up into the first compartment to discharge from the second compartment, the pavers had a high potential capacity of about 90 batches an hour. This capacity occasionally was attained in operation, but the

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own handbook, comparable to the

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other fields of engineering! Here

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average overall production, including time lost by temporary shutdowns or delays, ranged from about 51 to 56 batches per hour. With the large batch volume, this average output of batches per hour meant good progress.

When placing concrete in pavement of 9-in. uniform thickness, a 34E dual-drum mixer completed up to 2,000 lin.ft. of 22-ft. lane per day, equivalent to nearly 4,900 sq.yd. On this basis, the three pavers were good for more than 14,500 sq.yd. of 9-in. uniform-thickness concrete pavement in a day. For pavements of lesser thicknesses (7, 6 and 5 in.), the daily yardage increased. The greatest area actually paved by the three mixers in one day was 22,000 sq.yd. of 5-in. landing mat.

Batching Plant

In a big paving day, the three mixers consumed up to 117 railroad carloads of material: 17 cars of cement, 36 of sand, and 64 of gravel. A subcontractor maintained a steady supply of 381/2-cu.ft. batches to the mixers from a multiple-bin batching plant laid out on the two sides of three spur tracks, as indicated by an accompanying photograph. The plant included three bulk-cement bins (one 500-bbl. and two 250-bbl.) and three 70-ton aggregate bins served by six 11/2-yd. clamshell cranes. Two-batch and four-batch trucks hauled from the plant to each mixer, the number of hauling units varying with the size of the trucks and the length of haul. When returning empty to the plant, a truck ran to the first batcher that was clear for loading. Each of the batching bins, either aggregate or bulk cement, could load about 125 batches an hour, considerably in excess of the top capacity of a dual-drum paver.

Concrete design was based on a theoretical cement factor of 1.4 bbl. per cu yd. The 8-sack batch used on the job thus gave a theoretical volume slightly in excess of 381/2 cu.ft. Typical weights of ingredients for a batch, with average moisture content for the aggregate, were: gravel, 3,014 lb., including 1 percent moisture; sand, 1,930 lb., including 4 percent moisture; and cement, 752 lb. Water in the mix was limited to a total of 51/2 gal. per sack, designed for 3-in. slump. Because of variation in the moisture content of the large volumes of aggregate being unloaded from the cars, control of the water in the mix proved difficult, but it was held within close limits.

Concrete Pavement

To provide for various loading conditions by all types of planes, from heavy bombers to light trainers, pavement on the airfield was designed

(Continued on page 132)



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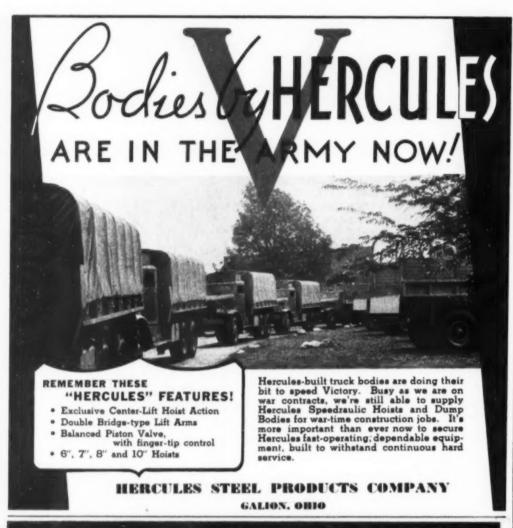
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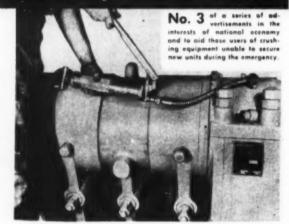
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- 3. Use only clean containers,
- Make it a practice to inspect bearings often at least four times daily with bronze bearings; once daily with roller bearings-checking them for over-heating.
- 5. Don't use cheap lubricants they cost more in the long run.
- 6. Place a burlap bag saturated with crank case drainings on top of the lower end of the toggle — it helps keep out dirt and lubricates the lower toggle seat.



- Keep adjustment wedges and screws clean. Oil regularly to prevent rust. Unless already enclosed, wrap screws with cloth, tied on, to keep out grit.
- 8. Squirt out a shot of grease from gun before greasing
- 9. Don't over-oil or grease. Too much lubricant can overheat bearings. Use thinner lubricant in cold weather. Not level plugs or name plates indicating quantity to use.
- 10. Don't keep adding oil when it should be changed.

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COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

(Continued from page 131)

in varied thicknesses. Uniform-thick ness pavement was chosen in preference to thickened-edge slab in order to simplify and speed construction.

Five runways furnish ample paved areas for landing and takeoff of all sizes of airplanes. Three of the runways have 9-in. uniform-thickness pavement, and two have 7-in. For use by training planes, two huge circular landing mats surround the intersecting runway system on the north and south portions of the field. As these mats are for use by light training planes only, the mat pavement has a uniform thickness of 5 in.

Taxiways connecting the runways with the aprons are 7-in. concrete, while the aprons are constructed of 7-in, slab, except in front of the hangars, where the thickness is 9 in. For apron extensions and a paved storage area added to the plan after the job had begun, a uniform thickness of 6 in. was selected.

Minimum Reinforcement

With the exception of steel mesh incorporated in pavement over sandfilled trenches and over an excavated muck area backfilled with clay under one runway, the slab contains no reinforcement. Apart from these minor areas of reinforcement, the only steel used in the pavement was 70 tons of dowel bars at 3/4-in. expansion joints spaced 120 ft. apart in runways, taxiways and aprons. In these three classes of pavement, transverse contraction joints were spaced at 20-ft. distances between expansion joints, and a longitudinal contraction joint was installed on the center line of each 22-ft. lane.

In the landing mats encircling the runways on the north and south parts of the field, no expansion joints were used except where mat pavement joined runway slabs or concrete drainage trenches. At these expansion joints, the 5-in. mat pavement was thickened to 7 in. To intercept storm runoff in the large landing mat areas, special drainage trenches having an open grating of precast concrete bars set flush with the pavement surface were installed at the lower edges of runway and mat pavement. Transverse contraction joints in the 5-in. landing mats were set on a closer spacing of 15 ft., and a longitudinal contraction joint was formed in the center of each 22-ft. lane.

For all classes of pavement, construction joints between 22-ft. lanes are the tongue-and-groove type, which keys adjacent lanes to each other. Contraction joints are the cleft, plane-of-weakness type, constructed and filled in two ways. In

(Continued on page 134)

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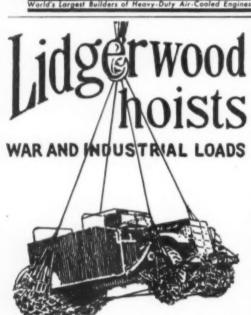
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(Continued from page 132)

runways, taxiways and aprons, with few exceptions, the clefts were formed during construction and were filled later with hot-poured bituminous compound. On the landing mats, the grooves were cut and filled immediately with premolded bituminous material by self-propelled joint machines traveling on the forms.

Paving Operations

To keep the pavers moving forward without interruption, the contractors equipped the job with about 43,000 lin.ft. of 9-in. steel form and about 23,000 lin.ft. of 5-in. form. Even greater quantities of steel forms could have been used to advantage. On the large areas of landing mat pavement, for example, forms for as many as 40 lanes were set at one time to keep the pavers busy. In the circular landing mat areas, intersected by paved runways, lengths of straight runs on the 22-ft. lanes varied greatly. Paving operations had to be concentrated on one mat at a time, leaving the other portion of the field clear for use by planes.

Expert form setters installed the forms accurately to line and grade by chalk line and T-bars between lineand-grade stakes set about 100 ft. apart. Self-propelled finegrading machines riding on the steel forms trimmed the clay subgrade to a uniform depth for placement of the concrete. The 34E dual-drum pavers traveled outside the forms. Where expansion joints were used, the bituminous-impregnated fiber filler and steel dowels were made up into unit assemblies for setting on the subgrade. Water was supplied to the paving

mixers by tank trucks.

Typical finishing and curing operations are shown by accompanying photographs made on 6-in. slab for an extension of the parking and warm-up aprons. The only special feature of this pavement is the installation of mooring eyes to tie down the planes. A two-screed finishing machine strikes off the concrete, and the surface then is floated with a longitudinal float. Following this operation, finishers go over the surface with straightedges and long-handled floats, and a joint machine installs the longitudinal center-line transverse contraction joints.

During the summer, two concrete spreading machines not appearing in these photographs were used ahead of the finishing machines following two pavers. One of the spreading machines was the transverse-blading type, and the other was the screw type. When these machines were operating on the forms in wet weather, the form crews took special pains to tamp sand fill solidly under the

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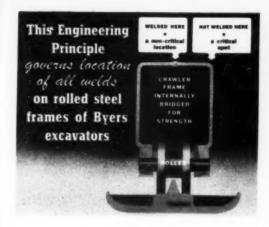
- · The book covers bricklaying fully, from the standpoint of producing the most satisfactory, durable work.
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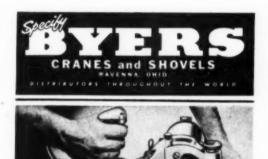
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bottom flanges in order to avoid form settlement

All the concrete pavement was cured under an impervious membrane of liquid sealing compound which was sprayed on the slab as soon as surface water had disap-peared. The liquid compound contained a fugitive dye to assist the operator in obtaining complete coverage of the concrete surface. Within a day after application, the colored dye faded out, leaving a transparent film of impervious membrane on the surface. According to one of the engineers in charge of the job, 1 gal, of the liquid covered about 225 sq.ft. of pavement.

Drainage Trenches

Natural slope of the field is from west to east on a grade of about 0.5 percent, and the longitudinal grade of the runways is low, conforming with the natural contours of the site. In cross-section, the pavement on all the runways has a continuous transverse slope of 0.5 percent from the upper edge to the lower edge. In the landing mats, it was necessary to make some provision to intercept the large storm runoff from runway pavement and landing mat pavement. About 11/4 mi. of concrete drainage trenches with an open grating of precast concrete bars (set flush with the pavement surface) were constructed to trap this runoff. Accompanying drawings indicate the features of these special drainage trenches.

Two main outfalls conduct the storm drainage from the field to a nearby stream. Construction of these outfalls and of the drainage systems leading into them had to be well planned and coordinated in order not to delay the paving operations, particularly where the drains intersect runways and other paved areas. Practically all the drainage pipe was precast concrete in 12-in. to 60-in. sizes, including some double 36-in., double 42-in., and double 48-in. lines. The pipe varied from plain concrete to triple-strength reinforced under the runways.

A box culvert 2,300 ft. long, intersecting an apron and three runways, was the most difficult feature of the drainage system to build. This culvert started as a 4x4-ft. box at the west end and ended as a quadruple 3x4-ft. box at the east end. A separate paving mixer, supplied from its own batching plant, furnished the concrete for the box culvert.

Direction

Design and construction of the airfield for the Naval Reserve Aviation Base was carried out for the Bureau of Yards and Docks of the Navy Department under the jurisdiction of

(Continued on page 136)



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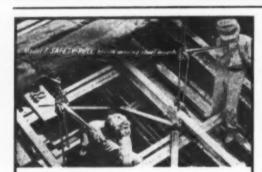
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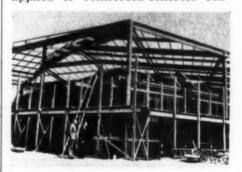
Capt. R. D. Spalding, public works office. Ninth Naval District, with Lt. Comdr. J. H. A. Brahtz in charge of design and Lieut. C. B. Cochran in charge of construction at the site, working in cooperation with Comdr. G. A. T. Washburn, commanding officer of the Naval Reserve Aviation Base. Field engineering was supervised by P. H. Sawyers. The contractor combination which executed the contract for the airfield was made up of the Standard Paving Co., White Consolidated, Inc., and the Mid-West Construction & Asphalt Co. Henry J. Boesch was project manager for the contractors. Batched materials were supplied to the paving mixers under subcontract by two firms, the Materials Service Co. and the Consumers Co., which united for this purpose.

Welded Diamond Grid

(Continued from page 45)

Diagrid frame is pitched slightly from a center ridge beam to the edge beams and columns. Recent developments in electric arc welding facilitated erection of the diagonal grid, which is designed with welded connections to insure the necessary rigidity and continuity.

Similar Diagrid framing has been applied to reinforced-concrete con-



SPECIAL ROOF FRAMING takes care of irregular shape at end of building erected over existing laboratory which it will replace.

struction in the United States, as well as in Europe. In a two-story service building of the Chevrolet Motor Co., Flint, Mich., a grid system of reinforced-concrete floor with span lengths of 55 ft. supports a 200-lb.-per-sq.ft. live load with a net beam depth of 20 in. In Europe, the system also has been used in timber structures.

PIA.

vibrator 7,200 For

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CONCRETE placement operating tions perm

with a hers when ing their crete po

The p direction partment the follo

Guy Derricks

Place Concrete for Loyalhanna Dam

(Continued from page 61)

vibrated with Chicago Pneumatic vibrators operating on a frequency of

7,200 rpm.

For the mass concrete, cast in 40-ft. wide blocks to form the body of the dam, the specifications permitted a maximum size of coarse aggregate of 6 in. and a minimum cement content of 3½ sacks per cu.yd. For pouring the big concrete monoliths cantilever type wood forms were used, as illustrated in an accompanying photograph. In connection with these forms, a safety feature was employed in the form of a walkway, equipped



CONCRETE IS VIBRATED, immediately after placement within forms, with heavy units operating at frequency of 7,200 rpm. Specifications permit coarse aggregate up to 6 in. size.

with a handrail, to protect the workers when setting the forms and raising them for the next lift of concrete pouring.

Personnel

The project was built under the direction of the U.S. Engineer Departments' Pittsburgh District, with the following officers serving succes-

(Continued on page 138)





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BOTTOM-DUMP BUCKET of 91-cu.ft. capacity swung into place by guy derrick, deposits load of concrete in body of dam.

(Continued from page 137) sively as district engineer: Lt. Col. W. E. R. Covell, Lt. Col. L. D. Worsham and Lt. Col. D. Lee Hooper. Ralph Platt served as resident engi-

neer. For the contractor, the Great Lakes Dredge & Dock Co., of Chicago, headed by Major Gen. Edward L. Markham (retired), Samuel J. Wright

acted as superintendent.

Bridge Wreckers Use Special Blasting and Rigging Technique

(Continued from page 71)

existing posts supporting the trusses was erected a temporary steel bent 21 ft. tall with rounded bottom designed to act as a rocker arm to carry the end of the span, during its descent, out, riverward, beyond its pier, leaving the south pier standing. Cutting torches then severed the south end of the span from its pier support preparatory to dropping the structure.

At the north end of the river span knee braces were inserted between



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ARMSTRONG Socket Wrenches extensions and handles are Chrome-Vanadium Steel. Ratches are drop forced steel and the patented ARMSTRONG Drivelock locks sockets, driver, ratchets and handles to each

other - will not knock or pry apart, sockets can not fall off. ARMSTRONG Giant Construc-tion Ratchets are drop forged steel. Nut sockets are machined from solid bar stock.



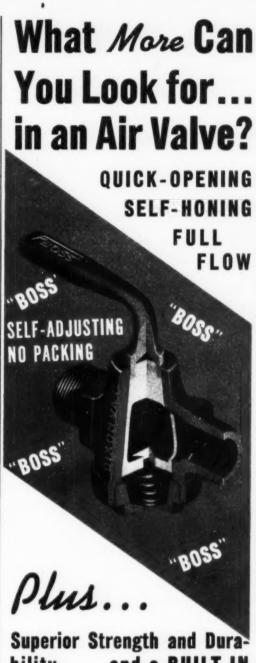
the bottoms of the posts and the first panel points of the trusses to make sure that the pier, when falling, would pull the span inshore with it. The old sandstone masonry pier, about 70 ft. in height and 41x10 ft. in plan at its base, was undermined by drilling 28 holes about 2 ft. above ground level. Each of these holes was loaded with dynamite and blasted to produce a cut about 4 ft. deep on the land side for the entire width of the pier. Next, a double row of 22 holes was drilled in the cut previously made and loaded preparatory to setting off the final blast that would topple the 2,000-ton masonry pier and bring down the bridge. A total of 224 lb. of dynamite was used in undermining the pier.

Landward Pull Exerted

In the meantime, in order to exert a landward pull on the river span when the base of its supporting pier was blasted, a pair of 11/4-in wire rope cables were hooked to north end of the span and carried to a block and fall rigged with five parts of 7/8-in. cable connected up with the hoisting drum of a crawler crane. The system of cables was anchored to deadmen well inshore from the north river pier. With this rigging of cables it was possible to exert a pull of 150 tons on the bridge span just as its supporting north pier was blasted. After the explosive charge was fired the pier toppled, like a felled tree, in a direction away from the river and dragged the span with it during part of its descent. The pier retained its shape until it had tilted through a considerable angle and then buckled at about its midpoint. Calculations of the wreckers indicated that, with the methods and rigging adopted, the north end of the dropped span would land about 35 ft. inshore from the base of the pier. The actual performance was better than this estimate; as measured on the ground, the distance of the end of the wrecked span from its pier was 40 ft. 6 in. The morning after the span was dropped crews started cutting up the steel with oxyacetylene torches to clear the river channel for traffic.

Direction

For the Cleveland Wrecking Co., of Cincinnati, Ohio, the demolition of the Central Viaduct was directed by John D. Powell, general superintendent. The firm of Wilbur Watson & Associates, of Cleveland, served as consulting engineers on the project of demolition.



bility . . . and a BUILT-IN HANDLE That Can't Come Off!

These are the reasons why "BOSS" Self-Honing Air Valves give such satisfactory, economical service in construction, mining and other industries. Their sound design includes attachment of drop-forged steel handle to plug inside body of valve, as illustrated above . . . handle cannot possibly come off, regardless of rough handling or severe vibration.

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CONSTRUCTION EQUIPMENT NEWS

(Continued)

RUBBER LUNG is recommended to supplement and increase effectiveness of Schaefer prone pressure treatment to restore breathing suspended through shock, fumes and gases or drowning. Device is strapped to back or stomach of victim and adheres to body through suction. Raising and lowering lung



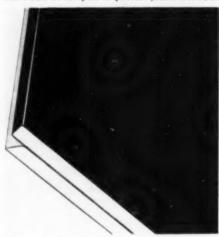
handle at normal breathing rate activates muscles of victim, causing them to draw in and exhale air. Unlike mechanical resuscita-tors, rubber lung does not force air in and out of lungs, but stimulates action of normal body muscles, helping them to do work required for breathing until they regain strength to perform unassisted. Lung may be used safely even by an inexperienced person. Only point to watch is timing to assure rhythm as close to normal breathing as possible.—E. D. Bullard Co., 275 Eighth St., San Francisco, Calif.

SPECIALLY DESIGNED SKIDS have further expanded usefulness of Truckstell-Thornton converted Ford truck by enabling it to carry expanded full cargo of lumber which may be loaded or unloaded in few minutes by winch and rollers. Empty skids are slid off truck to ground. Equipment provides "shuttle" service which



permits faster handling of lumber, avoids demurrage charges and tying up of railroad cars and conserves manpower and trucks by cars and conserves manpower and trucks by permitting one driver and truck to do work of several such units. Skids can be placed at various stations for loading, while others with full loads can be delivered and lowered to ground to be unloaded when convenient. Truck has wheelbase of 180 in, and has four the convenient of the convenien rear 8:25x20-in, tires on four wheels, all of which are driven by Thornton unit.—Thornton-Tandem Co., Grinnel Ave., Detroit, Mich.

IMPROVED GYPSUM BOARD, called Triple-Sealed Sheetrock Siding, claimed to cut cost of duration buildings up to 30 percent, builds. sheathes, sides, braces and decorates in one operation. Fireproof and weatherproof. In addition to triple-seal, "drip-cap" shiplap edge has been developed to protect joints between



boards from weather. Board of non-critical materials is said to have stood up under constant exposure to all weather conditions. Spe-cially designed for duration buildings, having camouflage green exterior surface for expo-sure to weather and manila inner surface that makes pleasing interior finish without decora-tion. Board is 1 in. thick, 2 It. wide and 6, 8, 9 and 10 It. long.—United States Gypsum Co.. 300 W. Adams St., Chicago, Ill.

PLYWOOD HOUSE

(Continued from page 74)

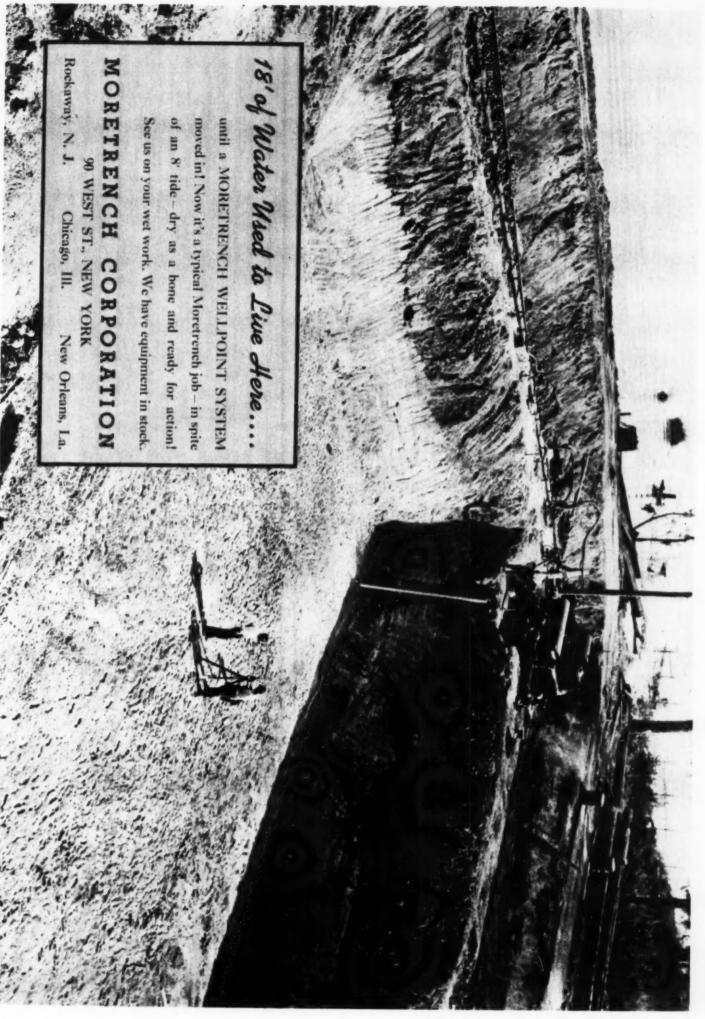
box girder, made up of wood pieces with plywood cover and diaphragms, accommodates electric wiring and serves as a heating and ventilating duct. Built-in features, including a table and dinette bench, closets, cabinets and drawers, are fabricated as unit parts of partition panels at the

Construction Speed

Allowing time for careful handling and assembly at the site, a one-family house can be erected by two carpenters and a helper in a day and a half. This erection speed makes it possible to complete a dwelling ready for occupancy within a few days after the ground is cleared for the foundation.

The house contains a living room, kitchen, two bedrooms and bath. All ceilings slope slightly, giving the effect of added room size.

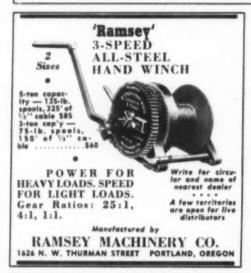
Prefabricated panels and parts for the house are made by three manufacturers long experienced in mass production with wood, plywood and glue. The manufacturers are the Harbor Plywood Corp.-Acme Door Co., Hoquiam, Wash.; the Buffelen Lumber & Mfg. Co., Tacoma, and the Wheeler-Osgood Sales Corp., Tacoma.



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supplements other advertising in this issue with these additional announcements of products and services essential to efficient and economical operation in the construction industry.

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Selling out complete layout, cranes, shovels, tractors, bulldozers, scrapers, graders, rollers, light plants, pumps, etc., and 21 trucks 34 to 4 ton, dump and stake body.

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WANTED:

l Diesel electric shovel, suitable for coal stripping operation, equipped with approximately 90' boom, and 5 - 6 yard dipper, capable of stripping up to 40' overburden. Either crawler or walking type acceptable. Must be in good operating condition.

W 135, CONSTRUCTION METHODS 330 West 42nd Street, New York, N.Y.

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Believe it or not, industrial accidents cost the United States (last year) 37,500,000 forty-hour weeks of productive time. The interest of our national welfare demands that nothing be left undone to reduce this terrific toll. Look: that amount of productive time is enough to build 8 more battleships, plus 40 more destroyers, plus 3600 more bombers, plus 16,000 more tanks. It is your patriotic duty to do everything possible to protect yourself and others from accidents—that we may produce more weapons of victory.

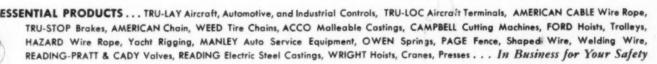
One way many operators have reduced time-out accidents is through the adoption of American Cable TRU-LAY PREFORMED WIRE ROPE. American Cable TRU-LAY is a safer rope to handle because it is preformed. Being preformed, TRU-LAY is flexible, tractable, willing to do what is required of it without crankiness. It resists kinking and snarling and possesses remarkable fatigue-resistance. More than this, broken crown wires in TRU-LAY PREFORMED do not wicker out to jab and tear workmen's hands. That is one of the big reasons why TRU-LAY PREFORMED is a safer rope. For your next line, specify American Cable TRU-LAY PREFORMED. All American Cable ropes identified by the Emerald Strand are made of Improved Plow Steel.

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AMERICAN CHAIN & CABLE COMPANY, Inc.

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He's the Worthington distributor, the man who handles Blue Brutes — compressors, rock drills, air tools.

If you need a Blue Brute—or several—fast...he'll do his darndest to get it to you as soon as possible after you hang up your phone. If your Blue Brutes are facing a stiff schedule, he's the man to send them to for a "physical"—a wise precaution these days when replacements

are hard to get. If rough treatment has turned up bruises or breaks, he's got a "first aid kit" of supply parts and repair "know-how" that will restore their pep and vigor.

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BLUE BRUTES

Blue Brutes on the Alaskan highway help punch through the vital life line that will help the U. S. Army smash the Japs! In addition, Blue Brutes are at work today on hundreds of Army, Navy and Air Force projects all over the country — in "uniforms" of olive drab and battleship gray, instead of customary blue.‡

*Reg. U. S. Pat. ;Blue Brute Compressors and Air Tools are painted olive drab for the Army and battleship gray for the Navy.

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